the

Journal

of the association for physical and mental rehabilitation

SEPTEMBER-OCTOBER, 1959 VOL. 13 NO. 5

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Studies in Clinical Physiology of Exercise, IV

PHYSICAL FITNESS AND SUSCEPTIBILITY TO INFECTIONS

(With Reference to Observations During the Influenza Epidemic in March, 1959)

ERNST JOKL, M.D.*

> Let no man look for much progress in the sciences—especially in the practical part of them—unless natural philosophy be carried on and applied to particular sciences, and particular sciences be carried back again to natural philosophy. For want of them, a number of them lack profoundness and merely glide along the surface of things
> —*Francis Bacon, 1620, in Novum Organum*

The clinical physiology of exercise is concerned primarily with the study of two basic problems, each of them of great complexity. The first problem deals with the patterns of *physiological* adaptation of the human organism which differ categorically from those encountered in *pathology*. The second deals with the fact that while physically active subjects such as soldiers, manual laborers and athletes do not enjoy a special protection against infections, the opposite holds good for certain *degenerative* diseases, among them those which commonly affect the cardiovascular system (7). While several studies have recently been conducted in regard to the latter issue, the inability of the training process to engender heightened immunological powers has received little attention, notwithstanding its great practical and theoretical significance.

Epidemiological Experiences

During the influenza epidemic of 1918-19 Hans Zinsser of Boston was impressed by the observation that among the men serving with the United States Overseas Expeditionary Force a large number of well-trained athletes became afflicted. Many of them died (14). In 1923, the great J. Jaddassohn found it necessary to refute allegations to the effect "that physiological variants such as general physical fitness and diet exert a protective influence upon the organism's resistance toward venereal infections." From clinical observations of outstanding sportsmen suffering from pulmonary tuberculosis the conclusion was drawn by investigators in France, South Africa and Italy that "the most common cause of sudden physical deterioration in a young person is pulmonary tuberculosis, and that this statement applies equally to untrained and to trained subjects" (4). W. Ritchie Russell in Great Britain presented evidence showing that the paralytic form of poliomyelitis fails to spare the athletically well-trained. Actually, he found that a conspicuously large number of subjects distinguished by superior physical efficiency became infected during the 1947 epidemic in England and that muscular regions of the body which had been exercised intensively on the day prior to the establishment of the paralysis were involved with unusual frequency (12, 13). Conversely, Gear found that in South Africa the underprivileged, malnourished and generally weakened Bantu population suffer much less from infantile paralysis than the much better situated white inhabitants of the same country. In populations in which large numbers of individuals belonging to economically favored strata have been vaccinated this epidemiological pattern currently undergoes a change (5).

Cussen's Report

Reporting of his experiences with the British Olympic team in Melbourne in 1956, James Cussen told a medical meeting at St. Mary's Hospital Medical School in London on March 20, 1958:

> The most irksome troubles we had with members of the British team were infectious. Naso-pharyngeal infections occurred frequently if the weather was a little colder and if there was much dust in the air. There were many cases of sore throats, nasal catarrh with closure of the Eustachian tubes and consequent deafness, as well as coughs. For some reason, skin infections are generally quite common amongst well-trained athletes and so it was at Melbourne. Pimples, boils, carbuncles, impetigo and tinea of the feet progressing to lymphangitis required attention. Of the latter there were quite a few cases. As the weather became warmer, gnat bites were common and severe inflammatory reactions from them were troublesome (3).

Schistosomiasis, Pyodermia and Rheumatic Heart Disease

Communicable diseases in athletes are of special theoretical importance because their occurrence reflects the validity of the concept under discussion: namely, that no immunological protection beyond that enjoyed by the population at large characterizes the physical status of the trained. Three specific examples are mentioned to illustrate.

A particular form of "swimmer's itch" frequently encountered in subjects from coastal areas of North America and from Hawaii is caused by certain blood fluke *Schistosoma* which are parasitic to man and which infest human skin with cecariae of avian

schistosomes. Such infestations occur irrespective of whether or not the victim is athletically fit or not (14).

A second example has been detailed by Bjornberg and Krook who examined the participants in the Swedish Cross Country Running Championships in Gothenburg in Sweden, with a view to obtaining information pertaining to the incidence of pyodermia, *i.e.,* septic infection of the skin. Their reason for paying attention to this condition was that they had recently had to treat several athletes thus afflicted. It was found that 52 of the runners had at some time or another suffered from the complaint under study. The fact that the men represented the cream of Sweden's sportsmen had no bearing upon their receptivity towards the causative agent, *viz.,* the staphylococcus pyogenes var. aureus, and the beta-hemolytic streptococcus. The latter two micro-organisms were isolated from the patients' skin lesions. In a subsequent inquiry the Swedish authors ascertained that 260 of the 950 cross country runners who were interviewed in various parts of the country had suffered from pyodermia. The condition is thus characterized as a potential epidemic disease. It was ascertained that its spread is confined to the autumn and that it coincides in this respect with the peak of morbidity of impetigo contagiosa. This is the reason why it affects with predilection cross country runners who go into training at a time of the year when the track and field season comes to a close (11).

Thirdly, that superb standards of athletic efficiency do not preclude the presence of rheumatic and other forms of heart disease of bacterial origin was proved by clinical analyses of cases in which superb standards of physical efficiency were in evidence notwithstanding the fact that manifestations of the condition under discussion were present. Such observations not only raise the question of susceptibility of the disease under reference but also that of its "active" as against "inactive" form in relation to, as well as that of the therapeutic limitations of, exercise and training (2).

Serological Studies

The relationship between physical fitness and the immunological resources of the human blood has been the subject of extensive studies. The issue revolves around two questions of fundamental significance—first, whether normal serological properties reflect individual resistance towards infectious diseases; and second, whether physical fitness is accompanied by an improved immunological status. Important methodological implications had to be considered in connection with both the above propositions (8).

Humoral and Body Immunity

As regards the question whether a consistent relationship exists between immunological properties of the blood and general body immunity, von Behring demonstrated in 1888 that the serum of rats destroys anthrax bacilli and concluded that the immunity of rats against anthrax was thus explained. He was contradicted by Lubarsch, who pointed out that rabbits are extremely receptive towards anthrax though their serum renders anthrax bacilli innocuous. Conversely, dogs are immune against anthrax though their blood possesses feeble bactericidal powers vis-a-vis the micro-organism under reference. In 1924 Hyde described a breed of healthy guinea pigs whose blood contained only 1/1000 of the normal complement. This humoral characteristic reflected a genetic feature which could be perpetuated over many generations.

In the course of his classical studies of opsonins Sir Almroth Wright found that following injection into an animal body of an antigen a "negative phase" ensues during which the concentration of the serological mediator under study is sharply reduced. However, his assumption that the animal would thus become more vulnerable to infection proved incorrect. Similarly, during a cholera epidemic, Svenson noticed that convalescing patients never became afflicted for a second time while subjects who had been vaccinated against cholera frequently succumbed to the infection, notwithstanding the fact that the latter's blood contained more antibodies than that of the former. Jurgens saw cases of re-infection with typhoid fever in convalescents whose blood had a high bacteriolytic serum titer.

As far as the part played by *normal* immunological properties of human blood in respect of resistance towards infection is concerned, hypotheses to the effect that knowledge of their fluctuation could serve as diagnostic means of identifying fatigue and over-fatigue, or training and over-training, did not stand up to the test of experimental and clinical evaluation. The wide-spread belief that a consistent relationship exists between humoral and general immunity and "fitness" is fallacious. However, it would be erroneous to draw the categorical conclusion that no clinical and epidemiological significance whatever attaches to humoral immune phenomena. The issue is complex involving different serological and tissue mechanisms for the different infectious diseases, a fact that proved to be of crucial importance in the study of the problem in its relationship to exercise and training.

The Hemolytic Power of Human Blood

Normal human serum hemolyzes red blood corpuscles from many animals, *e.g.,* sheep, pig, ox, cat,

pigeon, rabbit, guinea pig, tortoise, rat, and mouse. The hemolytic power of human serum against sheep erythrocytes can be assessed and is therefore widely used in connection with various diagnostic laboratory procedures in which the dissolution of red cells serves as criterion of evaluation. Hemolysis is but one of the many immunological effects which normal human serum is able to exert. Under terms such as "tropines," "agglutinins," "precipitines," "bacteriolysines" and others*, numerous functions of the blood have been described, each of them referring to certain serological reactions which are mediated by them. Until the second quarter of the twentieth century it was generally assumed that the above agents represent immunological entities of their own. This assumption, however, proved to be erroneous. The various serological processes under consideration are but different manifestations of a basic physio-chemical property of the blood which can interact in different ways with "foreign" cells, including bacteria and other micro-organisms (9).

Amboceptor and Complement

The hemolytic power of human serum depends upon "amboceptor" and "complement." The former acts specifically upon certain cells; while the latter is capable of "completing" a multitude of serological reactions once they are initiated by a specific amboceptor.

The Effect of Exercise and Training

Does the hemolytic strength of blood from exercised and unexercised, and from trained and untrained individuals differ? In order to investigate this problem it was necessary to apply methods with which both amboceptor and complement can not only be demonstrated but also measured. To do so was simple in the case of the amboceptor; while the problem of assessing human complement posed difficulties which had not previously been solved. In preliminary experiments we succeeded in elaborating a technique allowing titration of complement. Now the hemolytic structure of human blood could be analyzed.

Amboceptor and Emergency Function of Sympathico-Adrenal System

The concentration of the *hemolytic amboceptor* increases under the influence of a single physical exertion of the magnitude involved in the customary athletic, gymnastic, play, swimming and other sporting activities. The extent of the increase is slight and the titer returns to its homeostatic base level after rest. The time pattern of the change corresponds to that of the short-term reactions to exercise of blood morphology and chemistry as well as of other autonomic components which, as could be shown, are collectively "steered" by the release of sympaticomimetic substances from the suprarenal medulla. This observation was subsequently taken up by Selye who called it "Alarm Reaction." From it he subsequently developed his ideas of "stress." As early as in 1931 our studies indicated that at least one immunological component, *viz.*, the hemolytic amboceptor of human blood, forms an integral part of the "emergency function" of the sympathico-adrenal system (10).

It is possible that the fluctuations of the amboceptor during and after exercise are at times of pathophysiological significance. As previously mentioned, during epidemics of poliomyelitis the blood stream of seemingly healthy individuals often contains active virus which shortly after a single strenuous physical exertion give rise to paralytic symptoms. A similar immunological situation may arise in connection with the genesis of myocarditis and myopericarditis due to influenza virus as Adams has recently reported (1).

It is likely that the pathogenetic mechanism involved in clinical situations such as those under reference rests upon a distinct physical constellation. The permeability of body membranes changes during intensive exercise with the result that large molecules, such as certain globulins, and a number of microorganisms, among them strains of the poliomyelitis and of the influenza virus, pass through them, *e.g.*, from the intestinal canal into the blood stream, and from the blood stream through the hemo-encephalitic barrier into the central nervous system. Apart from the specific significance of these observations it is apparent that the problem of the effect of exercise upon susceptibility towards infections must be examined separately for each diagnostic or epidemiological condition.

Gibson has stressed the differentiated nature of the problem. He pointed out that "in rheumatic fever,

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**Agglutinin*—Antibody which aggregates a particular antigen (*e.g.*, bacteria, following combination with the homologous antigen).

Antigen—High molecular weight substances or complexes usually protein or protein-polyaccharide and occasionally polysaccharide in nature. When added to blood stream of animals or man it stimulates the formation of specific antibodies which react with the antigen *in vivo* or *in vitro*.

Bacteriolysin—(described by Pfeiffer, 1894) Antibacterial antibody which produces lysis of bacterial cells.

Opsonin—Normal antibodies which sensitize bacteria and other cells towards phagocytosis.

Phagocyte—Any cell that ingests microorganisms or other cells and foreign particles.

Precipitin—Antibody to soluble antigen that specifically aggregates the macromolecular antigen, *in vivo* or *in vitro*. Gives a visible precipitate.

Tropines—Immune antibodies which sensitize bacteria and other cells towards phagocytosis.

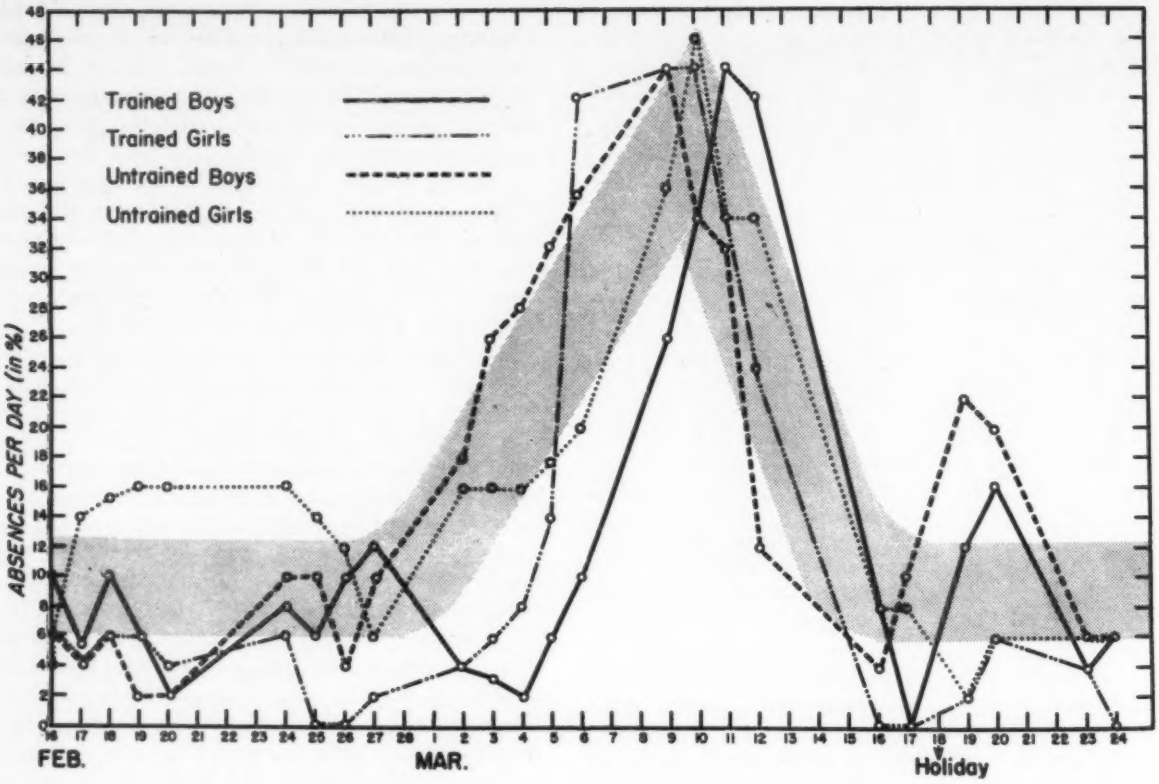

FIG. 1

Percentage ratios of absenteeism of trained and untrained boys and girls during influenza epidemic in spring, 1959. At the peak of the epidemic almost half of the children had to stay at home. School attendance figures were the same for both groups.

diphtheria and nephritis it would be bold, if not reckless, to try any other course than put feverish children to bed;" however, of 1082 feverish children studied by him (most of them with respiratory infections) all treated at home, 471 were kept in bed for three days while 611 were not put to bed at all. The results were identical for the two groups (6).

No consistent short-term changes of the *complement* function of the blood occur under the influence of a single muscular performance.

The University of Kentucky Physical Fitness Study

In the course of the "University of Kentucky Physical Fitness Study" undertaken in 1958 and 1959 at the Lexington Catholic High School, two groups of children between 13-15 years of age were examined in accordance with standardized developmental, physiological, psychological, medical, behavioral and physical performance criteria. Each group consisted of about 50 boys and 50 girls; *i.e.*, a total of 200 subjects were under observation. The general objective of the research was to ascertain the effect of daily intensive school physical training upon the personality structure of adolescent children. Fifty of the boys and 50 of the girls were included in the activity group; while the remainder were studied for purpose of control.

Observations During 1959 Influenza Epidemic

During the eighth week of the fitness experiment one of the most serious influenza epidemics that had ever been observed in Lexington, Kentucky, struck the community, unexpectedly and with great suddenness. Between February 26, 1959, and March 16, 1959, large numbers of children became afflicted. At the heigth of the wave almost half of the school population was absent: In our sample the normal average absentee ratio of 2-6% rose to an unprecedented level of between 42 and 46%.

The impact of the epidemic was precisely the same upon the trained and upon the untrained children. The fact that the preceding two months of training has significantly improved the "experimental" group's neuro-motor performances, while the physical performance status of the controls had re-

(Continued on Page 158)

A GROUP COMPARISON OF POST OPERATIVE AND POST INJURY CASES IN PROGRESSIVE RESISTIVE EXERCISE

KARL K. KLEIN, F.A.C.S.M., F.A.P.M.R.*

In dealing with the problems of physical rehabilitation following injury or post operative procedures of the knee, a basic assumption might be that the average injury case would be much less of a problem in terms of muscular deterioration and strength loss than the average post operative case in considering the same problems for physical rehabilitation. During a four year period, the Physical Education Laboratory of the University of Texas has had the opportunity of investigating this problem and gathering data from a large number of such cases. With this material available a selection of cases was made for this particular study. Those selected were chosen because the injury or post operative case was directly related to athletics. All cases were referred to the Laboratory either through the Student Health Service or the family or team physician.

The strength measurements were made with the use of the tensiometer (1) and the progressive resistive exercise systems used were those described by Zinovieff (6) and the author (3). These two varieties of P.R.E. were used during the four year period in which the data was gathered.

Procedures

Each subject or student, after coming to the Laboratory, gave a history of the knee problem, *i.e.*, how it happened, recurrent incidence, and specific exercise technique that was administered following injury, if any. In addition, medical history background was reviewed, the basic ligament tests were made, and the program was put into operation. The basic criteria for program completion was the development of bilateral muscular balance. Occasionally, the student was carried beyond this balanced status, but the data for the study was completed when balance was first obtained. Due to previous experiences in this type of work, it has been found that the development of balance usually takes a minimum of one month so the second strength tests are not administered until the end of the first month and thereafter, weekly, until balance is developed. This balance is the Composite Strength Score of both the quadriceps and hamstrings of one leg *vs.* the similar scores of the contralateral leg.

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The data gathered was treated through the following procedures:

1. Initial and final mean scores for the strength measurements, quadriceps and hamstrings, and the loading patterns for each of the strength groups were computed.
2. Initial and final mean scores were compared within the group for evaluation of gains. Also, the same scores were compared to test for similarity of groups.
3. The CR was computed for each of the factors being tested as well as each of the items being compared.

Analysis of the Data

Record of 30 of the post operative cases indicate that the mean time from operation to this program of specific rehabilitation exercise was 13.06 months. The maximum was 60 months, and the minimum was 1 month. Of this particular group, 8 stated that exercise was used as follows: 1 used a "millstone," 1 lifted a maximum of 70 lbs., 3 lifted from 17.5-25 lbs., 1 lifted 5 lbs., and 2 did "some exercise." None of these subjects did any hamstring strength building work. No information of specific exercise was given for the post injury cases.

For all practical purposes the two groups evaluated are identical in terms of the problem of strength loss and gain from P.R.E. The weight loading factors are also comparable, and it is apparent that the problems of muscular weakness in the injured players are similar to those of the post operative cases as far as the loading problems is concerned within the scope of the data of the study (Tables 2, 3, 5).

It should be further stated that this comparison probably would be different if all of the post operative cases were evaluated within the first few weeks following the operation when strength loss should be at its greatest. It is possible though that the severe injury cases would be involved in as much strength loss as the post operative cases if measurements were made as soon as practicable after injury. A very high percentage of the post injury cases were of high school incidence and so approximately one year or more elapsed from the time of the injury to enrollment in the university. From this evidence it may be concluded that *general activity or moderate forms*

of exercise were not the answer to the restoration of strength of the musculature involved in this study. It is also obvious that if the concepts of muscle physiology were taken into consideration during the recovery period, it would point to the necessity of and recognition of the maximal loading procedures. This method is the easiest and surest way of restoring these muscles of high strength potential to their maximal strength and power status in the shortest possible time. This should be the major objective in cases of this nature (5).

It is further obvious that the restoration to maximal protective strength is a difficult process unless physiological principles of continual overloading are put into effect during the recovery period. The increasing of this loading factor is very difficult to accomplish in systems other than P.R.E. For example, a 5 year postoperative case came to our Laboratory because the knee was still unstable in function; six weeks later a stable knee was developed; a student who had lifted 70 pounds with the quadriceps (no hamstring work) still experienced insecurity; he completed the program, lifting a maximum of 100 pounds with the quadriceps and 75 pounds with the hamstrings before security in function was assured. Similar incidents can be quoted from the contents of this study as well as years of experience working with cases of this kind.

Hamstrings and Atrophy

During the growth increments of young people, from childhood to young adulthood, there is considerable variation in the strength relationship between the hamstrings and quadriceps muscle groups. According to a basic antagonistic muscle relationship study by Clarke (2) figures are reported for age groups 9, 12 and 15 years, augmented by some data by the author (4) (Table 1).

From a general review of the literature it is apparent that little stress has been given to the hamstrings concerning their status of strength, and atrophy rate in injury and post operative situations. If the Table 1 relationships are accepted for the normal, information concerning the abnormal, as found in injury and post operative situations, should show whether or not the hamstrings are involved in the atrophy problem on a similar basis as the quadriceps.

The data for this study shows that in the injury group the hamstrings are 55% the strength of the quads, and in the post operative group, the hamstrings are 56% the strength of the quads. Comparing this with the age group chart of quad-hamstring relationships indicated that the hamstring musculature apparently atrophies at about the same rate as the quadriceps. According to this finding then, *the hamstrings should receive the same consideration in exercise stress in the rehabilitation process.*

Inter Group Comparisons

Up to this point the comparisons have dealt with intergroup comparisons for post injury and post operative cases. It is obvious that within the scope of this phase of the study, the two groups are very similar in terms of the total approach in the physical rehabilitation of muscular redevelopment.

The comparisons will deal now with the individual group in terms of initial and final scores in order to observe the results obtained in the physical rehabilitation process in increased strength increments as well as increases in the loading factor (Table 4).

From observation of data in Table 4 it is obvious that relatively high strength gains were made for the average case in this particular study. From this observation it might be concluded that lesser scores could have been obtained in the strength and weight loading areas which would have given high significance provided the data held constant during the lowered loading program. Because the basic purpose of each of the individual studies dealt with the problem of physical rehabilitation, the statistical outcome was a secondary factor in the actual purpose of the program. This point is being discussed because it is obvious that an "under loading" program which would, or could, result in statistically significant calculations and be used as a basis of argument to substantiate such a program might well justify the statistics *but would actually be cheating the person in terms of expected outcomes where maximal strength building was the problem of major concern.* It is on the basis of the findings here that many existing programs used for muscular rebuilding should be reevaluated in terms of the major expected outcomes:

Age Group	7	9	12	15	Frosh-Soph College	Varsity football-University Level
Hamstrings % of Strength of Quads	70	76.9	65.7	57.3	53-54	60

TABLE 1

33 Injury Cases — Leg Injured L-21, R-12 — 39% cases with weak ligaments pre and post exercise

10RM Start Wt. Load	10RM Final Wt. Load	10RM Gain Wt. Load % Increase	Startg. Tension Strength	Startg. Strength Imbalance	Final Str.	Str. Gain	% Str. Gain Over Initial
Quads 31.3 lbs.**	65.75**	34.5 lbs.* (95% gain)	Quads 190 lbs.	55 lbs.	274	84 lbs.	44.2%
Hamstrings 20.8 lbs.	48.7 lbs.	27.65 lbs. (132% gain)	Hamstrings 106 lbs. 55% strength of quads	25 lbs.	147.4 53% strength of quads	41.5	39.15%

34 Post Operative Cases — Leg Injured L-18, R-16 — 44% cases with weak ligaments pre and post exercise

Quads 33.8 lbs.**	68 lbs.**	34 lbs.** (87.6% gain)	196.2 lbs.	52.2 lbs.	277.5	81.32	41.4%
Hamstrings 23.8 lbs.	50.9 lbs.	26 lbs. (109% gain)	110.85 lbs. 56% strength	23 lbs.	148.82 53% strength of quads	38	34.5%

Mean weeks of exercise 4.5 (both groups)
RM=repetition of motion of muscle groups being exercised

**this is not inclusive of the weight of the boot which is 5 lbs.
*and is added to the starting quad load when divided into the 10RM gain for the percentage (%) gain figure.

Table 2

Quadriceps

Injury Cases — **Starting Weight Loading**
N = 33 — S.E. m. = 2.18
M = 31.30 lbs. — S.D. = 12.33
S.E.D. = 1.54

Post operative Cases — **Starting Weight Loading**
N = 34 — S.E. m. = 1.55
M = 33.8 lbs. — S.D. = 9.06
S.E.D. = 1.12

S.E.D. M1, M2 = 2.67. Diff. = 2.5*
"CR" = .93 (no sig. diff.)

Injury Cases — **Final Weight Loading**
N = 33 — S.E. m. = 2.57
M = 65.75 lbs. — S.D. = 15.0
S.E.D. = 1.85

Post operative Cases — **Final Weight Loading**
N = 34 — S.E. m. = 1.91
M = 68 lbs. — S.D. = 11.0
S.E.D. = 1.34

S.E.D. M1, M2 = 3.20. Diff. = 2.25*
"CR" = .70 (no sig. diff.)

Hamstrings

Injury Cases — **Starting Weight Loading**
N = 33 — S.E. m. = 1.02
M = 20.8 lbs. — S.D. = 5.8
S.E.D. = 0.74

Post operative Cases — **Starting Weight Loading**
N = 34 — S.E. m. = .69
M = 23.8 lbs. — S.D. = 4.01
S.E.D. = .49

S.E.D. M1, M2 = 1.23. Diff. = 3.0*
"CR" = 2.43 (a sig. diff. just above the .05 level. This is the only case where a sig. diff. was found.)

Injury Cases — **Final Weight Loading**
N = 33 — S.E. m. = 1.12
M = 48.7 lbs. — S.D. = 6.36
S.E.D. = 0.81

Post operative Cases — **Final Weight Loading**
N = 34 — S.E. m. = 1.35
M = 50.9 lbs. — S.D. = 7.79
S.E.D. = 0.96

S.E.D. M1, M2 = 1.75. Diff. = 2.2*
"CR" = 1.25 (no sig. diff.)

*It is interesting to note that although the one "CR" is significant at the .05 level, the actual pounds of weight loading difference varies only from 0.5 to 0.8 lbs. of the four measurements given.

Table 3

GROUP COMPARISONS OF THE 10 RM LOADING FACTOR

Cases	Starting Strength	Final Strength	"CR"
Injury			
33	M = 189.9 lbs. S.E. m. = 8.61 S.D. = 49.1	M = 274 lbs. S.E. m. = 7.23 S.D. = 41.2	S.E.D. M1, M2 = 11.2 Obt. diff. = 84.1 tension lbs. "CR" = 7.50 (highly significant)
Post operative			
34	M = 196.2 lbs.	M = 277.52 lbs.	Obt. diff. = 81.32 tension lbs.
	Quadriceps		
Injury			
33	M = 105.97 lbs. S.E. m. = 4.6 S.D. = 26.2	M = 147.4 lbs. S.E. m. = 4.7 S.D. = 26.8	S.E.D. M1, M2 = 6.57 Obt. diff. = 41.47 tension lbs. "CR" = 6.31 (highly significant)
Post operative			
34	M = 110.85 lbs.	M = 148.82 lbs.	Obt. diff. = .38 tension lbs.
	Hamstrings		
	Inter-group Comparisons of the Initial and Final Strength Scores (Minimum .01 level score needed: 33 cases — 2.73; 34 cases — 2.72)		
Injury	M1 = 65.75 lbs. S.E. m. = 2.57	M2 = 31.3 lbs. S.E. m. = 2.18 S.D. = 12.33	DM1, M2 = 4.22 Obt. diff. = 34.45 lbs.
Quadriceps	S.D. = 15		"CR" = 8.153 highly sig.
Post operative	M1 = 68 lbs. S.E. m. = 1.91	M2 = 33.8 lbs. S.E. m. = 1.55	S.E.D. M1, M2 = 3.02 Obt. diff. = 34.2 lbs.
Quadriceps	S.D. = 10.95	S.D. = 9.06	"CR" = 11.324 highly sig.
Injury	M1 = 48.7 lbs. S.E. m. = 1.12	M2 = 20.8 lbs. S.E. m. = 1.02	DM1, M2 = 1.51 Obt. diff. = 27.9 lbs.
Hamstrings	S.D. = 6.36	S.D. = 5.8	"CR ' = 18.476 highly sig.
Post operative	M1 = 50.9 lbs. S.E. m. = 1.35	M2 = 23.8 lbs. S.E. m. = .69	S.E. DM1, M2 = 1.51 Obt. diff. = 27.1 lbs.
Hamstrings	S.D. = 7.79	S.D. = 4.01	"CR" = 17.947 highly sig.

Comparisons of Initial and Final 10 RM of Loading

Table 4

maximal restoration of strength to support the joint for maximal security in function and freedom from anxiety while participating in athletics.

It is interesting to note, for example, that in the injury case group that an average total of 125.57 tension pounds of strength was gained in the exercise program (quads, 84.1 and hamstrings, 41.47). If the factors were held constant, a minimal .01 level could be determined for significance, *i.e.* for quads:

$$\frac{X}{11.2} = \text{2.72 (.01 sig. level) which would be 30.46 tension pounds.}$$

For the hamstrings the formula would be:

$$\frac{X}{6.57} = \text{2.72 (.01 sig. level) which would be 17.87 tension pounds.}$$

By adding these two factors together 30.46+17.87, a total of 48.33 tension pounds, a rough conclusion could be drawn that a sub-maximal program might only have produced this much strength gain and although significant, would be far less than the actual gains that could be developed from a scientific heavy progressive exercise system that is actually needed for

Starting Quad Strength

Injury: M = 189.9 lbs. **Post op:** M = 196.0 lbs.
S.E.D. M1, M2 = 13.2; Obt. diff. = 6.30 lbs.
"CR" = .47 (no sig. diff. in starting strength measures.)

Final Quad Strength

Injury: M = 274.0 lbs.; **Post op.:** M = 277.52 lbs.
S.E.D. M1, M2 = 11.1; Obt. diff. = 3.52 lbs.
"CR" = .317 (no sig. diff. in final strength measures.)

Starting Hamstring Strength

Injury: M = 105.97 lbs.; **Post op.:** M = 110.85 lbs.
S.E.D. M1, M2 = 7.94; Obt. diff. = 4.88 lbs.
"CR" = .61 (no sig. diff. in starting strength measures.)

Final Hamstring Strength

Injury: M = 147.4 lbs.; **Post op.:** M = 148.82 lbs.
S.E.D. M1, M2 = 8.4; Obt. diff. = 1.42 lbs.
"CR" = .169 (no sig. diff. in final strength measures.)

In the comparison of the two groups of cases it is interesting to note that there is apparently a minimal of variance in the total measures of the post injury and post operative groups.

INJURY CASES VS. POST OPERATIVE CASES

TABLE 5

producing maximal strength gain. This is the major objective in a program of this nature.

Progressive Resistive Exercise and Ligament Stability

In this particular study, 39% or 13 cases of the 33 post injury cases had various degrees of ligament weakness. Forty-four percent or 15 cases of the 34 post operative group also had various forms of ligament weakness. This weakness factor was determined by the accepted testing procedures. No effort was made to establish a specific degree of weakness. There were no incidences of posterior cruciate weakness.

At the end of the exercise program, the ligaments were again checked for stability status. In both the post injury and post operative case groups there was no apparent change in ligament status. The conclusion is that progressive resistive exercise apparently has no influence on increasing the stability of ligaments previously weakened as a result of traumatic injury.

Conclusions

1. Within a certain amount of time, both post operative and post injury knee conditions apparently take on similar characteristics in terms of strength loss and muscular deterioration when physical rehabilitation is delayed.

2. Apparently, the hamstrings, functioning under similar loading emphasis, do not develop strength as rapidly as the quadriceps.

3. There is a slight reduction in the percentage relationship between the hamstrings and quadriceps from the beginning to the end of the exercise program.

4. The percentage strength building capacity of the hamstrings is below the capacity of the quadriceps—mean hamstring strength gain was 36.8% while the quadriceps gain was 42.8%. This difference has a CR of .72 which is not significant.

5. Ligament structures of the knee that are determined to be weak before exercise do not respond to the specific program in regaining stability.

6. That with known ligament insecurity at the end of the exercise program the student should be taught the concepts of developing "habit patterns of active muscular tension" when in movement so that the muscles will compensate for the ligament insecurity.

7. The developmental chart of quadriceps-hamstring relationship should be considered in the developmental program for the various age levels.

8. The hamstring muscles should be given equal emphasis with the quadriceps in the developmental, as well as reconditioning, process.

9. The utilization of systematic Progressive Resistive Exercise is the surest way to restore maximal muscular function in the shortest possible time and is a "must" in cases where muscular deterioration is present following surgery or injury.

REFERENCES

1. Clarke, H. H., Cable Tension Strength Testing. Chicopee, Mass.: Brown-Murphy Co., 1953, 62 pp.
2. Clarke, H. H., Personal correspondence.
3. Klein, K. K., Progressive Resistive Exercise and its Utilization in the Recovery Period Following Knee Injury. *Jrnl. Assoc. Phys. & Ment. Rehab.* 10:3:94-98, June 1956.
4. Klein, K. K., Physical Education Rehabilitation Laboratory Studies, Univ. of Texas (unpublished).
5. Smillie, I. S., *Injuries of the Knee Joint.* Edinburgh: Livingstone Co., 1951, pp 1-13.
6. Zinovieff, A. N., Heavy Resistive Exercise, the Oxford Technique. *Brit. Jrnl. Phys. Med.*, 14:129, 1951.

CONSTITUTION, BY-LAWS CHANGES AVAILABLE

APMR will make available to its members corrected pages for insertion in the Constitution and By-Laws. These changes reflect measures adopted at the 1959 convention. Any member interested in keeping his own copy of the Constitution and By-Laws current may receive a copy of the changes by mailing a request to John E. Davis, Sc.D., Executive Director, APMR, 105 St. Lawrence St., Rehoboth Beach, Dela.

VA PARTICIPATES IN TURKISH TB CONFERENCE

Two Veterans Administration physicians and a VA bacteriologist were among the 26 United States participants in the 15th International Tuberculosis Conference of the International Union Against Tuberculosis, in Istanbul, Turkey, September 11-18. They were William B. Tucker, M.D., director of tuberculosis service for the VA in Washington, D.C., James W. Raleigh, M.D., secretary of the VA-Armed Forces Committee on Chemotherapy of Tuberculosis, in Washington, D.C., and Ernest R. Runyon, Ph.D., of the Salt Lake City, Utah, VA hospital.

CURRICULUM PROBLEMS IN A UNIVERSITY CORRECTIVE THERAPY PROGRAM

ROBERT E. SHELTON*

To understand some of the basic problems of establishing a curriculum in any university, one must first realize that deviations from the university's true function and contribution to society have evolved. The university is supposed to educate the youth of our great States, or, as Webster defines it, "to develop and cultivate mentally or morally, or to fit for a calling by systematic instruction." This function seems to have been radically altered. The university's sole objective now appears to be to develop scholars. The trend of higher education has lost its touch with the practical aspects of education and is embodied in theories and philosophy. Its progress is measured in the numbers of advanced degrees awarded each year. The undergraduate curricula is developed in view of its relationship to the graduate level, and consequently, an undergraduate program to prepare a student for a specific area like corrective therapy does not blend too well into the total picture. Therefore, many problems arise in developing a special course of study that in many respects is looked upon as too technical for general education.

Instituting a curriculum, whether it be undergraduate or graduate, is not a simple matter. Many traditional standards must be coped with. Many and varied ideas of the school in general must be respected. Universities are operated by committee decisions and each school and college has two or three subcommittees through which a request must pass. Time is no problem with college professors; they move slowly and "everyone is an authority on everything." If your original request hasn't been so changed when returned that it is unrecognizable, you will be too old to read it.

In all due respect to the universities of the country, it is hard to convince the directors of the responsible colleges of the total worth of a curriculum for an area that has not definitely arrived at conclusions as to exactly what its field needs. The growth and development of any profession is directly and ultimately affected by the standards of its educational affiliation. To expand in knowledge we must first possess a basic understanding of the fundamental principles underlying everything we represent and endeavor to accomplish

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To build a strong educational program for any profession the approach must be made similar to that of the architect who plans a building to endure for centuries. Our plans must be practical and purposeful. The architect does not sit and dream up ideas he thinks will work; they must be workable and fit into the program of the builder. The most important item in any building program is a good foundation. This is no less true of an educational program. A *good* undergraduate curriculum should be a prerequisite to graduate study. Standard requirements should eventually be established in order that the quality of instruction of the university graduate be the same everywhere.

The many problems that have confronted the establishment of a curriculum of corrective therapy at the University of Illinois are probably typical of any state university. After ten years of constant pioneering, the present curriculum is of an unofficial status. Many of our difficulties may be present in various physical education departments, in colleges, in state universities.

The physical education college has become expanded in its scope to cover a multitude of associated curricula, to the point where basic physical education is losing its original concept. The present curriculum of general physical education is overloaded with courses approved by the executive committee which it feels should be included in an undergraduate program. Not enough elective hours are provided to immediately incorporate all courses required for a specific corrective therapy curriculum. To establish a new course in a curriculum the gamut mentioned earlier must be run if it is to ultimately receive the approval of the Board of Trustees.

The biggest hurdle of all first comes in the College of Physical Education itself. Here we have representatives of all the various and sundry departments competing with each other in building their own little empires. The basic requirements of the health education curriculum, physical education, recreation, athletics, safety, driver training and research have little coordination as to basic instruction. Therefore, some of the more technical courses necessary in the education of the corrective therapist cannot be immediately introduced The number of elective hours open to the undergraduate is limited by the general university educational requirements for graduation.

Two semesters of rhetoric and composition are required. Two years of military training (unless the student is physically unfit) must be taken. History, languages and humanities requirements must be fulfilled. The limitations of practice teaching in corrective therapy for educational requirements for teachers present a problem since clinical affiliations of comparable calibre of general teaching have not yet been universally established and recognized.

An existing deficiency of established courses in the field of corrective therapy produce a big obstacle in curriculum development. Specific biological sciences that can be correlated with therapeutic exercise are not required. Science courses that offer a basic understanding of correlated medical study are not included. There is no continuity of the existing sciences of anatomy, physiology, kinesiology and physiology of exercise. An institution *not* located in a medical center has little opportunity for correlated medical courses. This problem must be met by summer school affiliations with medical institutions or courses in the curriculum must be established with the assistance of health service physicians or those in private practice in the community.

There is a lack of trained teaching personnel in the corrective area. Most instructors are on a part-time basis pursuing advanced study, with little or no background in the area of corrective therapy. Most of the competent therapists are not interested in teaching, but in a more active practice in hospital, clinics, or privately.

There are budget limitations which affect the expansion of facilities and a full-time teaching staff. The budget of any college is set on the basis of the overall program needs.

The attitude and interest of the majority of educators in universities is not one of disinterest, but they are uninformed as to the growing needs and possibilities of corrective therapy. The administrators of the university are unacquainted with the fact that this area of rehabilitation is a part of physical education. Rehabilitation in a university is a relatively new field; administrators have not become aware of its wide educational scope.

The attitudes and objectives of university administrators and educators toward the importance of teaching have changed considerably in recent years. The emphasis on research has almost completely dominated the scene. Teaching and technical training in specialized areas are often of minor importance. The tremendous emphasis on required writing and research as a means to promotion and financial advancement has brought about inferior teaching standards in many instances. The many good teachers are moving to more fertile and remunerative fields. Funds for equipment and facilities are not available for a teaching situation but unlimited for research projects. The progress of any profession is dependent on its basic research and publications. However, it must be an honest, worth-while research endeavor with publications a contribution to the literature. One of the greatest problems confronting the educational system today is evaluating our basic research controlling our professional literature. It is impossible for one person to master all three. The teacher and the research-minded specialist must be separated. Each is dependent on the other, but the system breaks down when the two are combined. The honest research specialist must not be concerned with the end results or he becomes prejudiced in his findings and is tempted to alter his methods lest the results may not be as valuable as he hoped. In research some of the subjects must be sacrificed for science's sake, and some may derive harm from the experiments. The teacher cannot experiment. A teacher or therapist in rehabilitation is concerned with the effects of all persons, and his interest is in the whole individual and total recovery. The research person is interested in numbers and statistics and the positive and negative effects of his problem. The exactness of teaching procedures are based on the exactness of the research done in that area. The basic educational principles underlying both professions are fundamentally different. The basic fundamental personalities of these two professional people are different. Therefore, their areas must be developed separately in a training program.

A major problem confronting the organization of a corrective therapy program in any institution is handicapped by the limitations of facilities and material. Enrollment increases have brought about crowded conditions. Housing has the greatest priority in appropriations. Gymnasia and field houses are of minor importance. Clinical space for an area of physical education not yet fuly recognized as essential is unavailable. A corrective therapy program concerned with training students for a field mostly outside the educational picture must be developed gradually. The administrators must be convinced of its merit before consideration is obtained. At the University of Illinois it has taken ten years to gain major interest within our own college in the University.

The existing medical program on most university campuses is not adequate for necessary medical supervision of clinical training. Unless a medical school is available, local medical assistance is necessary in providing appropriate instruction and clinical ma-

terial. The confidence and respect of the community physician and health service physician must be gained through years of professional relationship.

The establishment of any university curriculum is decided on the needs of its service and security of its profession. The following points are considered by the administrators in evaluating the merits of a proposed curriculum: What are the job opportunities for graduates in this area? What is the placement procedure? How will these placement problems affect the university? How will placement be handled? What will be the cost of such a program in additional personnel to handle these duties? What are the minimum and maximum salaries for graduates qualifying for this area? What is the professional rating with the medical profession or total rehabilitation agencies? What are the possibilities of advancement in rank and scholastic attainment? How can this area be tied up with general education oportunities?

Probably the greatest consideration in planning a corrective therapy program in a university is the source of clinical application. At the University of Illinois excellent opportunities have been provided for the interested student through the corrective physical education, adapted sports, and special rehabilitation program. Students gain part-time experience through class assignments in our professional corrective therapy courses. Also, students in corrective therapy are required to participate in our Out-Patient Exercise Therapy Clinic, which is organized in cooperation with the Health Service and local medical physicians. An affiliated course in exercise therapy has been established with Danville Veterans Administration Hospital. Students participating in this program will receive university credit and qualify for Veterans Administration service as corrective therapists. Affiliated programs with local hospitals can be satisfactorily arranged with proper approach and planning.

Another large problem in establishing a successful curriculum in any institution is the source of prospective students. We must remember in the present-day organization of physical education that there are many departments competing for prospective students. If we are to develop a specialized area within this college, we must be armed with many attractive offers. The student today is looking for the best "angle" and the best possibility of security. He is not interested in service. That is one attitude that must eventually be changed if our educational system is to continue successfully in our society.

A program of proselyting must be established: Lectures to high school students on "Career Days" during the regular year; publicity in school papers; talks and demonstrations about rehabilitation to civic groups in the community and other localities of state; lectures to orientation classes for freshmen in colleges of physical education; active contribution of staff personnel to the community welfare by assisting the local medical society in meeting the problems of the handicapped; serving as board members of organizations dealing with handicapped problems (i.e., Polio Foundation, Cerebral Palsy, Crippled Children Society, Vocational Rehabilitation, etc.); in general, making contacts with local medical societies in every way possible and building a sound professional relationship. This is a good sound system of salesmanship and propaganda. Corrective therapy must first be sold to each community before it can grow nationally.

In our curriculum planning we should evaluate the factors behind the objectives of training corrective therapists. We all have our theories in the variety of courses established in the few schools already concerned. The most important consideration from the standpoint of professional status is this: The student *must* have a desire to be of service to his fellowman; he must be endowed with a self-giving concern for the welfare of the handicapped person; he must possess the character and personality necessary for this adaptation. There is no future for the "angle boys" in this profession.

Regardless of all the associated medical courses incorporated in the curriculum, a good strong physical education background must be preserved. The work of the corrective therapist is the only really true facet of good physical education left in our colleges. It is individual in its application. It is practical and not theoretical in its approach. The patient is a human being trying to readjust himself to society and not a number in the file of lost records. The good physical educator must be able to teach. The ability to teach is the common denominator in solving all the problems of the less fortunate that comprise our rehabilitation programs of the handicapped. The physical educator has been the successful corrective therapist because he has the outstanding attributes necessary in handling his problems. He knows the philosophy, theory, and practical application of exercises. Exercise is the physical educator's stock in trade. He understands exercise tolerance. He understands the minimum and maximum dosage the human body can endure. He knows the effect of exercise on the abnormal and the subnormal because he understands the effect it has on the normal. In knowing the tolerance of the *normal* individual, he can better judge the progressive pace of the *subnormal*. He has an understanding of the principles and practice of

teaching exercise. The trend of therapy is into the home for the chronic and long-term convalescents; therefore, the therapist must be able to teach someone else how to administer therapeutic exercise—a parent or family education program. The physical educator understands the principles of motivation in prescribing exercise. He is a participant himself. He knows the price one must pay to attain good physical conditioning. He is physically strong enough to handle the job. His personal physical conditioning is necessary in providing security in safely handling the patient. He is enthusiastic in his work as he likes to perform and appreciates physical progress. The physical educator's goal from the beginning is to help others and to teach his fellow man how to better care for his physical status. He is an extroverted personality. He is an optimist. He gets along well with people. He meets people well and understands the methods of appeal. He knows how to command respect of others as he knows the principles of leadership. He knows the psychological aspects of competition and is able to transfer this desire to the patient in his fight with his handicap.

As you may observe, the problems of curricula development in the universities are not confined to administration alone. Its problems are many, and the profession of corrective therapy must give the university all the assistance it can in educating those responsible for its direction by good, honest and sincere ethical practice. The future of corrective therapy rests entirely with the people who are genuinely concerned with establishing and developing better educational standards and ethical experience as members of the ancillary medical team.

AMPUTEES STAFF PROSTHETIC SERVICE

A veteran with an amputated leg shuffled up to the desk of a husky young official at a Veterans Administration clinic. He eased himself into a chair. "I'll never get used to this thing," he said, pointing to his artificial limb.

"Oh yes you will!" replied the VA man. "Look at me." He rose and strode easily across the room. He raised the leg of his trousers. He, too, was wearing an artificial limb.

Half an hour later the veteran left the office, his hope restored and with some valuable pointers on how to adjust to his new leg of wood and chrome.

This VA official is a member of one of the most exclusive employee groups in the United States Government, VA's corps of prosthetic specialists. Each of the 76 men who make up the corps wears at least one major arm or leg prosthesis for service-connected disability. All except three lost at least an arm or a leg during their wartime military service. Their job is to help disabled veterans obtain artificial appliances—legs, arms, braces, plastic eyes, hearing aids and the like—and to give instruction on their proper use.

What's more, their job is to instill courage, to demonstrate that serious disability need not slow a man down nor keep him on the sidelines. And that, VA explained, is why prosthetic specialists are themselves amputees. They can understand the problems of similarly disabled veterans; when they speak, veterans listen. These specialists are found throughout the VA, most in outpatient clinics but several as supervisors in VA area medical offices. Instead of the normal quota of 152 arms and 152 legs, these men can count up only 92 legs and 124 arms. Nine have lost both legs; six have both arms missing.

All but three are married. Sixty-six of the married men have children, an average of three per family. One is raising nine youngsters. On the average, they are in their early forties. The oldest is a World War I veteran nearly 61; the youngest, a World War II veteran pushing 34. All entered military service as enlisted men, but 26 later became officers. The highest rank attained was lieutenant colonel. VA's prosthetic specialists are no novices at their work. Together, their service adds up to 719 years, or 9½ years apiece.

Typical of these men is Henry Clay Bass of the VA regional office in Baltimore. A linesman for a power company before the war, he joined the Army Signal Corps in 1941. He was injured in a dynamite explosion, losing both hands, one eye and his hearing. He also suffered severe lacerations and came close to losing his left leg as well. He joined the VA in 1946, first in San Diego, then Muskogee, Okla., and finally Baltimore.

REMOTE CONTROL TYPEWRITER MAY AID HANDICAPPED

A remote-control typewriter that may revolutionize the lives of many handicapped persons is on a "trial run" at the Bronx, N.Y., Veterans Administration hospital. While the results are yet too early for evaluation, the typewriter suggests exciting possibilities for paralyzed patients, according to Dr. A. M. Kleinman, hospital manager.

"For the first time this new mechanism is being given a practical test among our patients," Dr. Kleinman said. "We have installed it for a three-month test and at the end of that time will be in a better position to judge whether the machine can have widespread application."

The machine, labeled a "Grafoton" by Dr. Allan Ziskind and his brother Richard of New York, who developed it, is operated by a beam of light from a lamp attached to the patient's forehead. Moving the beam of light across an upright "keyboard" causes transmission of impulses which reproduce the typewritten letters. Behind each letter is a photo-electric cell which when hit by the light beam activates a relay which depresses the letter or symbol wanted. Only one key is depressed at a time, and the beam can be adjusted for maximum accuracy. The Grafoton actually is operated by the head and neck muscles. The patient plays the light beam over a vertically-mounted panel displaying the letters and symbols of the IBM right handed typewriter keyboard.

Single experiments have demonstrated that the machine is practical if the patient can adapt psychologically to the requirements. Even a severely disabled person may turn out 30 words per minute, a fair speed for a beginner typist. However, the experiment at the Bronx VA hospital is the first long-range trial with a variety of patients.

The typewriter was developed at the Boston University School of Medicine and Boston City Hospital. It has been demonstrated also at the New York University-Bellevue Institute of Physical Medicine and Rehabilitation.

One patient, a nine-year-old boy, suffering from arthrogryposis, or congenital deformity, of both wrists, after a few minutes practice with the Grafoton typed a 25-word sentence in two minutes and forty-five seconds. Previously, using a standard typewriter, he had required six months to perfect the same sentence. When using the standard typewriter it had been necessary for him to hold his sleeve in his mouth and wag his hand back and forth across the keyboard.

"The new machine holds exciting possibilities for the rehabilitation of many patients with severe neuromuscular disabilities," Dr. Kleinman said.

PSYCHOLOGICAL PROBLEMS OF AGING*

THOMAS A. MARCH, M.D.**

Introduction

In the prologue of one of George Lawton's books (8), there is recounted a story which I am sure many of you have heard but which bears repeating:

> Once upon a time in Asia Minor, the story goes, it was the custom for people who had reached the age of 60 to be taken away to a cave where they might live in peace for the rest of their lives and would, of course, be out of other people's way. It was proper under such circumstances that when it came time for the aged man to leave for his cave, his son would contribute the necessary food and a woven blanket.
>
> One day a middle-aged man asked his own little boy to take the blanket and come with him and Grandpa for he was taking the latter to the cave from which none returned. Though the grandson was heartbroken at the thought of his grandfather's departure, he was about to shoulder the blanket obediently when he suddenly was struck by an idea. Cutting the blanket in half, he took one part with him and left the other part at home. When the grandfather had been deposited with due filial piety in the cave, son and grandson returned home.
>
> It was then that the father discovered what had happened to the blanket. He scolded his little son severely saying, 'Look what you have done, everyone will say we were too stingy to give Grandpa the whole blanket.'
>
> 'No, father,' the boy replied, 'I wasn't being stingy, but I thought it was better to give Grandpa only half; then I could keep the other half for you.'
>
> The father was terribly shocked to hear this and began to weep. When he recovered himself he answered, 'Come, let us return to the cave and bring grandfather home.'
>
> From that time on in Asia Minor, no grandfather was ever sent away and no grandfather was in other people's way any more.

From this story I want to begin an exploration of the whole question of the psychological factors in the aging process. First, let's momentarily glance at statistics which make important the exploration to which we have referred:

In 500 A.D., the average life expectancy of the Greek was 18 years. In 1900, there were three million Americans over the age of 65, four percent of the population. In 1949, 11 million people were 65 years of age or over. Today, oldsters are crowding the 15 million mark, representing about nine percent of the total population. By 1975 statisticians expect 25 million to be over age 65, rougly 13 percent of the projected population. It seems hardly necessary to outline the reasons for this increase in the old age group which we will arbitrarily refer to as those 65 years of age and upward. Suffice it to say that medical science has been instrumental in this prolongation of life.

If one were to diagram the population according to ages, for 1900 the curve would appear as a pyramid with the apex representing a small proportion of the old age groups and the base of the triangle representing a large proportion of infants and children. At the present time a diagram of age distribution of the population would assume the shape of a barrel with the largest proportion in the middle age bracket representing the "belly" of the barrel and the "head" representing the older age group. It would correspond to a certain extent with the base or the infant and childhood group. This change in the age distribution of the population is unique in Western Culture.

I think it is important at this juncture to ask ourselves what aging really means. As Masserman (9) says:

> Concepts of aging have been borrowed from our cultures and the range has comprised almost every possible way of treating the aged. In fact, from a comparative psychologic standpoint, the same range may be seen in animal societies. Herds of red deer cherish the aged since elderly survivors can lead them to a variety of pasturages remembered from many previous years. Hence, senior members are protected because of the welfare of the herd. On the other hand, predatory beasts like wolves exile their aged—turn them out—leave them to fend for themselves—which is closer to our own particular culture. In the Asiatic finished culture, the elderly are honored and even romantically cherished. In Hellenic times, the elders governed through the Senate, and the aged Homer was revered both as a wise man and a poet. Among the Labrador Eskimos, the patriarch considers it a final duty to sacrifice himself for the good of the group. If the food supply should become insufficient, he will quietly wander away from the village and deliberately freeze to death.

It is well known that Eastern philosophies revere and venerate the old as a part of their culture; the teachings beginning from early birth foster the worship of ancestors and the placement of the aged in the family in a position of great respect and usefulness. The second half of Hamlet's soliloquy, I think, best exemplifies the most general concept of aging with the profound pessimistic note as expressed in that soliloquy.

> To sleep: perchance to dream; ay, there's the rub:
> For in that sleep of death what dreams may come
> When we have shuffled off this mortal coil,
> Must give us pause. There's the respect
> That makes calamity of so long life;
> For who would bear the whips and scorns of time,
> The oppressor's wrong, the proud man's contumely,
> The pangs of despis'd love, the law's delay,
> The insolence of office and the spurns
> That patient merit of the unworthy takes.
> When he himself might his quietus make
> With a bare bodkin? who would fardels bear,

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* Presented at conference, Mid-Atlantic Chapter, Association for Physical and Mental Rehabilitation and Tri-State Chapter, Association of Rehabilitation Therapists, Pittsburgh, Pa., April, 1959.

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To grunt and sweat under a weary life,
But that the dread of something after death,
The undiscover'd country from whose bourn
No traveller returns, puzzles the will,
And makes us rather bear those ills we have
Than fly to others that we know not of?

Let us first review the physical aspects of aging. As a Harvard professor of Medicine once said, "The older a man gets, the more he looks like a frog." Naturally, this concept of ourselves is most difficult to accept, particularly in this age when the attributes of youth are considered so important and are emphasized daily in our papers, radio and television.

The homeostasis of man can only be maintained by adaptive processes growing out of the internal and external environment of the organism. The internal environment is comprised of the physical changes in the organism brought about by disease and aging processes. The external environment is obviously the world about us; the social-economic factors, interpersonal relationships and in short, man's reaction and adaptation to his immediate surroundings.

Internal Environment

Now if you will, let us focus in a brief way on some of the internal environmental changes contributing to senescence and the devastating effect of these changes which necessitates psycho-dynamic equilibrium, and for the purposes of clarity, we might discuss some of the aging processes. I am sure that there are many others far more authoritative in these fields than I, and I make no claim except to reiterate some of the well accepted facts of the internal environment of the organism accompanying the aging process.

Not all parts of the body age the same. Certain anatomical and physiological changes due to aging vary from one part of the body to the other and from individual to individual. Without becoming technical we can very quickly enumerate the predominant changes:

1. Progressive loss in homeostatic capacities in the organism. The body is less capable of maintaining the constancy of its internal environment.
2. Decrease in basal metabolism.
3. Impaired functional capacity of the cardiovascular system.
4. Gastro-intestinal irregularities.
5. Resistance to injury and disease decreases. Susceptibility to drugs and toxic influences increase.
6. Changes in reproductive functions.
7. Changes in sensio-motor capacities; reduction in visual acuity; hearing impairment; loss in vibratory sense.
8. Reduction in reaction time.
9. Heredity which plays a fundamental role in most changes since there is less physical reserve capacity to maintain homeostatis. We can consider the whole gamut of change as producing extraordinary limitations on the adaptive processes.

External Environment

It is obvious that both the external and internal environment are concomitant in their actions and both must be evaluated to understand the psychological problems of the aging man or woman. The external environment has always been an important and oftimes a determining factor in maintaining emotional equilibrium. In senescence there are many factors in the environment which the younger person can accept with some equanimity but with the aging they necessitate profound adaptive changes.

The complexities of urban living obviously add to the complexities of the aging with the loss in physical tone of the body, loss of energy and some decrease in the senses. The fast pace and the hurry expressed in the urgency of younger people congregated together presents a most difficult situation for the aging man or woman who must be alert to the dangers, changes, and adaptations of thickly populated areas. The slow, tranquil existence of rural living presents a reversal, and therefore, easier adaptation for the aging. Other complexities are due to home situations where many families live together in small apartments; rapid transit and communications, large scale amusements; labor-saving devices in factories and industry and the dwindling of the handicrafts; decline of the homestead and relative impermanence of urban abode; fluctuating business conditions; early retirement; and increasing population.

These are but a few of the innumerable socio-economic factors which make the adaptive processes of the aging difficult to attain while emotion remains stable.

Psychological Changes Inherent in Senescence

According to Kaplan (7):

It is only recently that psychologists have shown serious concern with psychological changes inherent in senescence. Interest in this field has not been commensurate with its importance. Measurement of the psychological ability in the normal age is difficult. It is further expressed —'a dividing line between normal aging and psychotic aging is statistical rather than abrupt.' It has been found that ordinary intelligence scales used on younger individuals cannot always be properly applied to the aging in order to determine what one usually accepts—a decline of intelligence as one grows older. Our intelligence tests have, for the most part, been standardized on young people and specifically designed for young people. Their use with older persons is open to challenge.

While the physiological aspects of the aged have been stressed, it is recognized that some of the effects of homeostatic breakdown may operate through the social as well as the physiological environment

In order to understand the psychological problems of senescence, it will be necessary to review the psychological milestones of the life span of the individual in its entirety; first, birth, (and some consider psychological changes appearing during gestation) in the years following through infancy and early childhood; second, adolescence; third, climacteric and fourth, senescence.

I don't propose at this time to delve into the deep dynamic psychological factors represented by each of these periods of life except to state something that each of us is aware of: The dependency of the newborn, the development through growth of patterns of awareness of reality in the organism's adaptive processes in early childhood; the struggle against dependency and the attempt of the individual to become independent; the focusing of all patterns of behavior; the establishment of values; the introduction to adult living and the adjustment to mature responsibilities. It is here at adolescence that the struggle goes on between infantile urges and adult conformity. Many psychological adaptive mechanisms begin to assert themselves, and the person enters maturity supposedly well equipped with the adaptive mechanisms for worthwhile living. In the climacteric we see an attempt at readjustment by virtue of change in reproduction and the myriads of conflicts exposed. Within the organism lies a new adaptation process in the mechanisms that maintain emotional equilibrium which we term mental health. Senescence carries with it a new challenge to adaptive living in the face of reduced energy, slowing of intellectual processes and diminished motivation. I have purposely avoided psychological jargon and technical phrases so that we may view the life-span from the standpoint of one fundamental common denominator. If one keeps in mind that the whole process of living from birth to death involves constant adjustment of all adaptive processes, it is not too difficult to understand that at the specific milestones that we have enumerated previously, the body-mind must make extraordinary readjustments in order to adapt to living. For instance, without alluding to the complexities of adolesence one can discern in the individual the attempts to discard the dependency of childhood of the mother, the father, the family and friends and to assume the independence of adult living. This is an over-simplification of the complex problem of moving from childhood toward maturity. It is a psychological fact that to maintain emotional equilibrium it becomes necessary to substitute one adaptive mechanism for another. It is not enough to rid ourselves of childhood dependency, we must substitute for this need which has developed in the early years of life and compensate for this loss. Thus the whole processes of adolescence are complex consisting of substitution and replacement while maintaining stability of emotion. Each of the psychological milestones of the life span carry with them their own particular substitutes and replacements as we have indicated in the case of adolescence.

All of the old anxieties, hates and resentments, all old compulsions begin to occupy us when we are no longer busy, when we are no longer needed, and when we are alone. As we grow older, our forgotten childhood revives our memory of childhood, especially as our memory for recent events fades. Nothing is more pathetic than this poignant spectacle of men and women, 60-70 and over, still driven by the anxieties and ambitions of youth, still torn by insecurity and guilt of their adolescent years (9).

An aging person has a personal situation to meet and with his loss of vigor and intellectual capacities he may attempt to:

1. Compensate by denial as though nothing had happened.
2. Over-compensate by becoming intolerant of young people.
3. Give in completely.
4. Accept the limitations and adjust.

We have all had deprivations and frustrations, rebelled against them and in compensation have become dolorous, helpless and insistently demanding. We know how a depressive feels. It is difficult to reconstruct from our own experience what the "senile" must feel. Unfortunately, very little work has been done in investigating the psychological factors of the aging processes. The question of mental capacity and intelligence of younger individuals is most difficult to apply to the aging group so that what passes for deterioration and loss of mental capacity is oftimes a result of lack of motivation and considerable emotional turmoil.

The almost universally accepted fact that it is difficult for the aged to develop new skills and training is not particularly borne out in all cultures. Margaret Meade has pointed out that in Bali because of the dominant belief in reincarnation, many people easily learn new complicated tasks while in their 60's. Psychological changes of old age do not come only from anatomical and physiological changes in the brain; changes in the brain are only one small source of stress among many factors. Autopsy findings are strongly contradictory and not at all conclusive. Those individuals with marked anatomical and structural change may show no particular adaptive problems while pathological inspection showing noth-

ing of any structural change will be found in those with severe psychotic changes due to maladaptation. Structural changes create less stress for the person. Those who have adapted well to life situations adapt well in old age. All are related to constitutional endowment and personality development.

Sexual adjustment is often a difficult problem for aging persons. Those with a lighter load of sexual anxiety remain sexually potent past age 60 and in a more guiltless biologically natural culture, their strong sexual vigor might well become the average expectation. The important problem of sex offenses against small children is closely linked up with this whole question of declining sexual potency in aged persons. One very large group of sex offenders is made up of men in their 50's and 60's who are relatively or completely impotent—who feel themselves incapable of approaching an adult woman sexually, but who find they can get a vicarious type of sexual pleasure by making some sort of sex advance to young children—usually little girls. A number of elderly sex offenders are definitely cases of senile deterioration and belong in a mental hospital.

A study done on over 60,000 persons in Japan four years ago showed that the incidence of psychosis decreased after the age of 55 and that the rate of emotional disorders was lower than in European and American societies. Despite our concept of the aging, history is replete with many accomplishments during the aging period: Among the Greeks, Socrates' greatest contributions to philosophy were made at age 70; Plato did his best teaching after 60. Writers Victor Hugo, Jules Verne and John Milton were at the height of their literary powers after 60, and Goethe who started *Faust* at 60 finished his masterpiece at 82. Gladstone, the great English statesman, was a powerful figure in political circles at 80, much as Sir Winston Churchill is today. In America, Louis Agassiz gave his greatest lectures at age 51; Emerson's *Conduct of Life* was produced when the essayist was 59; Phillips Brooks was preaching powerful sermons at age 84; and Noah Webster at 70 produced his famous dictionary.

As humanitarian therapists, let us first of all apply the Golden Rule and not try to deprive our elders of what we ourselves will eventually cherish. If Grandpa thinks that Yogi calisthenics or Yogurt cheese will make him a centenarian, or Grandma believes she still looks enticing in low-cut dresses and such foibles, up to the age of practicality it may do more good than harm. As to new cults and philosophies, let us remember that even great men in their last years needed them. The sociologist Comte began to worship a heavenly society presided over by his dead wife. The aging astronomist Eddington preached that God, too, was but a master mathematician. Sir Oliver Lodge became a health spiritualist. Recourse to wishful fantasy is not enough. The aging also need and try to retain human contacts and control. If these are not furnished along constructive channels, the aged may retreat to querulous dependencies and in a sense demand indulgent baby sitters for their second childhood. Obviously, one way to avert empty loneliness of old age is to develop while yet young, a versatility of interest, techniques and satisfactions that can be continued throughout life—reading, science, art, philosophy—these are all deathless and almost independent of retained manipulated skills (9).

I have purposely avoided entering the field in discussion of the feeling of failure of the aging person in an adaptation—or in other words, the psychosis associated with the aging. My purpose in doing so is not that many things might be done in the treatment of the senile psychosis, but that our first line of defense and understanding must be at the point where the possible failure of adaptation be entirely avoided. In other words, our approach must be considered as preventive. Oddly enough, the same approach in the treatment of the senile psychotic would be almost the same as what we have discovered in satisfying a psychological complex of normal aging. It could not be better expressed than by Weinberg (11):

In later life, maladaptive situations may arise from improper role playing because of failure to adapt to, or recognize, a change in status. This is particularly apparent when a parent's dependency on a child in all financial matters, his living space, etc. is complete. In this reversal of the roles they had played earlier, the parent has become the child and the child the parent. Neither is quite prepared for this state of affairs and paradoxically enough, the more well-intentioned each is, the more difficult to carry out the new role properly. The child, accustomed to a set of expectations from his parents, may recognize the parent's inability to perform in the manner the child had learned to expect. Yet, the child, now the man, may be emotionally unable to accept any other relationship with his parent than the one he had established in childhood. He may resent the change and feel a hostility toward him because of the parent's increasing inability to measure up to that standard. Hurts and resentments may appear in either member of this relationship. The child may unconsciously act out on his parents the real or imagined angers which he believes were once perpetrated by them on himself. The parent, on the other hand, may be totally unable to give up his previous stand and position, or he may realize that he no longer fits his earlier conception of himself. This frustration may push him into inappropriate behavior which is likely to be misunderstood. All sorts of subtle, and not so subtle, situations may arise which help to disrupt the lines of communication that previously existed between the parent and child.

The problem of the aging is a most intricate one which requires considerable research and study. There is no panacea for this, and we have studiously avoided delving into the aging processes because as Talleyrand says, "Everyone wants to live long, but nobody wants to be old." I am reminded of the story of the old Vermonter, age 86, who was asked why it was that he had lived so long and replied, "I don't know unless it is because I have never died."

Grow old along with me;
The best is yet to be,
The last of life, for which the first was made;
Our times are in his hand
Who saidth "A whole I planned,
Youth shows but half; trust God: see all, nor
be afraid."

. . . Browning's *Rabbi Ben Izra.*

How can we go about correcting the problems of therapists as expressed by John Dewey? First, changes must insure to every individual the chance to have intrinsically worthwhile experience in living as he lives, and secondly, we must provide useful outlets for maturity and wisdom gained from experience.

There should be an assurance to those in the aging group of a part in the world of affairs; relief from fatigue, no change or very little; if there is change, take time for it; relief from worry and financial insecurity; avoid physical discomforts; protection from injury; make allowances for perceptible difficulties; tolerance and understanding. The modern concept and policy on retirement need revision in light of the growing problem of today. It should be possible for those retiring to retire not from—but to something else.

In youth prepare for age—develop secondary interests and avocations. Certainly both age and youth can be friends. There is certainly not much that can be accomplished about social economic conditions with the high speed of living and without the aged one's adaptivity. But certainly such changes can be softened and we can make provisions for the utilization of the aged person and in some instances encourage them in developing new skills and tasks. It is ironic that during war years, when youthful help was at a premium, oldsters were welcomed in industry with open arms. In times of peace on the other hand, it is a most difficult thing for an aged person to secure employment (7).

REFERENCES

1. Bowman, Carl M., Personality Development in Aging Adults. *Geriatrics* X: 563-566, Dec. 1954.
2. Gilbert, W. S., Old Age and Medicine. *M.D.* 2:66-72, 1958.
3. Granick, Samuel, Personality Adjustment of the Aged in Retirement Communities. *Geriatrics*, 12:381-385, June, 1957.
4. Greenleigh, Lawrence, Some Psychological Aspects of Aging. *Social Case Work* 36:99-106, March, 1955.
5. Hall, Bernard, The Mental Health of Senior Citizens. *Nursing Outlook*, 4: 206-208, April, 1956.
6. Kaplan, Oscar J., *Mental Disorders in Later Life*. Stanford: Stanford Univ. Press, 1956.
7. Lawton, George *Aging Successfully*. New York: Columbia Univ. Press, 1945.
8. Lawton, George, *New Goals for Old Age*. New York: Columbia Univ. Press, 1943.
9. Masserman, Jules H., Psycho Dynamics of Aging *Geriatrics* 12: 115-122, Feb., 1957.
10. Pressey, Sidney L., Potentials and Factors in Health—a Psychological Study. *Genetic Psychology Monographs* 56: 159-205, 1957.
11. Weinberg, Jack, Aging of Groups. *V.A. Prospectus—Research and Aging*. 1959.

PHYSICAL FITNESS—Cont'd from P. 144

mained unchanged, proved to be devoid of immunological relevance.

Summary

Physical fitness has no categorical bearing upon resistance to infections. In a study conducted during the influenza epidemic of Spring, 1959, the percentage incidence of children afflicted by the disease was the same for a sample group of trained children and for untrained controls.

REFERENCES

1. Adams, C. W., Postviral Myopericarditis Associated with the Influenza Virus. *Am. Journal Cardiol.*, July 1959.
2. Bourne, Geoffrey, Examination of the Heart in Recruits. *Brit. Med. Journal*, Oct. 5, 1940.
3. Cussen, J., *Proc. Brit. Assoc. Sport and Medicine*. St. Mary's Hosp. Med. School, London, Mar. 20, 1957.
4. Dormer, B. A., J. Friedlander and E. Jokl, Physical Efficiency and Pulmonary Tuberculosis. *So. Africa Journal Science*, 38, Jan., 1942.
5. Gear, J.H.S., Epidemiological Patterns of Poliomyelitis in Southern Africa. *Med. in S. Africa*, 1957.
6. Gibson, J.P., How Much Bed Rest is Necessary for Children with Fever? *Journal Pediat.* 49:256-261, Sept., 1956.
7. Jokl, Medical Theory of Gymnastics, *Brit. Journal Physical Medicine*, Jan.-Feb., 1948.
8. Jokl, E., Serologische Untersuchungen an Sportsleuten. *Z ges. exp. Med.*, 77:5-6, 1931.
9. Jokl, E., Ubersichtsreferate aus dem Gebiet der Sportmendizin. *Leibesubungen* 7, July, 1932.
10. Jokl, E., Uber Beeinflussung der immunbiologischen Normalstruktur des menschlichen Serums durch Korperarbeit *Z. Neur.* 129:3-4, 1930.
11. Pyodermia in Runners. *Journal A.M.A.*, Sept. 13, 1958.
12. Russell, R., Poliomyelitis, the Pre-Paralytic Stage and the Effect of Physical Activity on the Severity of Paralysis. *Brit. Med. Journal*, Dec. 27, 1947.
13. Russell, R., Paralytic Poliomyelitis, the Early Symptoms and the Effect of Physical Activity on the Course of the Disease. *Brit. Med. Journal*, Mar. 19, 1949.
14. 'Swimmer's Itch.' *Journal A.M.A.*, Aug. 23, 1958.
15. Zinsser, Hans, *Resistance to Infectious Diseases*. New York: the MacMillan Co., 1931.

"From Other Journals"

Unless otherwise noted, all abstracts have been prepared by Philip J. Rasch, Ph.D.

Bruno Balke and Ray W. Ware, "The Present Status of Physical Fitness in the Air Force." *School of Aviation Medicine, USAF report* 59-67.

Modern life has almost removed the necessity for greater physical effort. Conferences on physical fitness pose the question, "Fit for what — shuffling papers?" Since fitness is not defined, it is not measurable and standards cannot be defined. The purpose of this study was to obtain more information about the normal range of physical performance in man.

The test consisted of walking on a treadmill at a speed of 3.3 mph on a horizontal level. Each minute the angle was increased 1 per cent. Attainment of a pulse rate of 180 beats per minute served as a cut-off point. Of the 500 Air Force personnel tested, 42% were rated as being in "poor" physical condition, 40% as "fair," and 18% as "good." Those in poor condition would have little chance of surviving in emergency situations requiring a higher rate of energy expenditure.

J. C. Eccles and A. W. Wiley, "Factors Controlling the Liberation of Acetylcholine at the Neuromuscular Junction." *American Journal of Physical Medicine*, 38:96-103, June, 1959.

A number of studies have shown that the neuromuscular junction is the site of spontaneous subthreshold potentials resulting from the random release of quanta of actetylcholine from the motor nerve terminals. A nerve impulse produces the coordinated discharge which makes up the e.p.p. by a transient acceleration of these resting discharges. This is affected by a depolarization of the membrane, which releases the quanta from their containing vesicles.

R. J. W. Withers, "Rest and Exercise," *Ulster Medical Journal*, XXVII: 117-129, November, 1958.

Nature in her efforts to effect cure has two powerful natural allies, rest and exercise. The question arises which to employ. Hippocrates taught that "exercise strengthens whilst inactivity wastes." This sums up all of our scientific knowledge of the physiology of the atrophy of disuse. Early movements of injured limbs is one of the principles recognized by the ancients and almost perennially re-discovered.

In 1741 Nicholas Andre published his *Orthopaedia*, in which he held that the muscles were the chief instruments in shaping the child's body and the instruments by which the doctor and parent developed a child free from deformity. By the time of John Shaw (1823) rest and support had become the accepted treatment for spinal curvatures. Shaw rebelled against this and urged the necessity for graduated exercise. About the same time Jacques Delpech, in France, was teaching that normal poise of the body results from a balance action between opposing muscle groups. If this balance is upset deformity results, and it is the surgeon's business to restore mucular balance. He built the first orthopedic hospital, in which gymnastics was part of the daily routine.

In Sweden Per Henrik Ling (born in 1776) produced a system of medical gymnastics aimed at positive health and fitness. His methods were simple, but his disciples developed them into a bewildering code of arbitrary and empirical practices. If we adopt arbitrary practices we must make doubly sure that the results obtained are due to the means we have employed. If our practices have no known rational basis then it is our duty to determine by research and controls how far the means we employ are accessory to the cure which is taking place.

We know little of how passive physical measures—heat, cold, sunlight, and massage—work and are not sure what influence, if any, they have on pathological and biological processes. Certainly, many patients say they are benefitted by physiotherapy, and no one will deny that it has a strong psychological effect, but we must never give the patient the impression that we have the cure, and he need only passively await the miracle.

We are "in the clear" if we use physical measures only as a preparation to encourage the patient to be active. This preparation is the production of muscle hyperaemia. The essential for success is that the patient be an active and not a passive participant.

To return to rest, Hugh Owen Thomas, who flourished between 1834 and 1891, proclaimed that "Rest must be enforced, uninterrupted and prolonged." He devised splints to give limbs rigidity for support and movement, in effect furnishing his patients with an exo-skeleton which relieved bones and muscles of work and stress. However, Juste Lucas Championniere, a Frenchman, insisted that all fractures in which joints are involved must be treated by an early application of movement.

The tissues of the body have such a strong intrinsic power of repair that they will effect a cure even in disadvantageous circumstances. Fractures in wild animals heal without medical intervention. The surgeon only makes Nature's task easier. Common sense dictates rest during the early stages of orthopedic injury, but a point is soon reached where rest can no longer help and its continuance makes the chances of eventual movement less and less. The sooner the patient realizes that progress depends on his own efforts carried out in small doses many times daily, the quicker and better the ultimate results.

Lester Rice and William Fishbein, "Exercise Table for Muscle Strength." *Industrial Medicine and Surgery*, XXVIII: 278-279, June, 1959.

A group of 52 women was given passive exercise for 10 weeks on a table which alternately stretched given muscle groups and then permitted them to relax. The average strength of the muscles increased, the increases varying from 2.9 per cent for the muscles of the neck and upper shoulders to 16.9 per cent for the posterior muscles of the triceps. There was no significant change in the strength of a control group of 26 women.

Erling Asmussen and K. Heebll-Nielsen, "Posture, Mobility and Strength of the Back in Boys, 7 to 16 Years Old." *Acta Orthopaedica Scandinavica*, XXVIII: 174-189, 1959.

It was the purpose of this investigation to determine whether there is a correlation between the form and function of the back in school children and to determine how these change during the school years. The concepts of "good" or "poor" posture are very subjective and to a high degree based on esthetical criteria rather than on mechanical or physiological principles. Measurements were taken by a special goniometer by which it was possible to measure the angles between a vertical frontal plane and the projection onto a sagittal plane of any line connecting two chosen points on the surface of the body. Muscular strength was measured by means of dynamometers during maximal isometric contractions.

Kyphosis seems to decrease slightly and lordosis to increase with increasing height. The inclination of the pelvis decreases with increasing height. Forward flexibility of the spine shows a tendency to increase with height. On an average, flexibility of the spine is larger in those with more pronounced lordosis and the strength of the back muscles is greater; for the abdominal muscles the tendency goes slightly in the opposite direction. The increase in muscular strength with height follows an exponential curve, due, probably, to the fact that muscular strength is proportional to the transverse section area of muscle, which must be expected to increase with height or any other linear measure.

The correlations suggest that backs with the larger lordosis are stronger and that the stronger backs exhibit more pronounced curves. There was no sign of better function in those with flat backs. This puts grave doubts on the value of the Harvard standard-types. One cannot avoid the thought that it has been fostered by people with prefixed ideas of how a good soldier ought to look. The assumption is that the more curved back is more functional.

Leonard Marmor, "Common Orthopedic Problems of Interest to the General Practitioner." *GP*, XIX: 109-110, May, 1959.

Subdeltoid bursitis is a deposit of calcium in tendons about the shoulder joint. Usually there is localized tenderness over the anterior aspect of the shoulder and swelling may be obvious. Patients usually respond well to multiple needling of the deposit with 5 cc Xylocaine and 25 mg. of Hydrocortone. The patient should start on active exercise of the shoulder, including pendulum type.

Epicondylitis, resulting in tenderness over the medial or lateral epicondyle of the humerus, may be relieved by injections of Hydrocortone and Xylocaine. The patient should avoid any forced motions of the wrist extensors or flexors for several weeks.

Wrist pain may result from acute calcium deposits in the tendons of the wrist and fingers. Warm soaks and local injections of Hydrocortone usually cause a favorable response in about a week.

Editorial, "Differences in Incidence of Internal Disease in the Two Sexes." *Canadian Medical Association Journal*, 80:991-992, June 15, 1959.

Certain diseases are almost sex-linked. The following are predominantly male diseases: angina pectoris, myocardial infarction, bronchitis, bronchiectesis and emphysema, pulmonary tuberculosis, gastroduodenitis, gastric ulcer, duodenal ulcer, carcinoma of the stomach, and cirrhosis of the liver. Gall-bladder disease, goiter, hyperthyroidism, tetany, hypochronic anaemia, osteoarthritis, and vegetative dystonia are much more frequent in the female population.

There are significant physiological differences between the sexes. Since every cell in the body contains the characteristics of its sex, the likelihood must be accepted that the cells of the two sexes react differently to environmental stimuli. Better understanding of the causes of sex-linked differences should help materially in the investigation of the pathogenesis of internal disease.

A. W. Sloan and E. N. Keen, "Physical Fitness of Oarsmen and Rugby Players Before and After Training." *Journal of Applied Physiology*, 14:635-636, July, 1959.

The effect of physical training on the resting pulse and Harvard Step Test scores were studied in oarsmen, rugby players, and controls not undergoing any systematic athletic training. Subjects were tested at the beginning of the academic year, and the tests were repeated two to four months later. At the beginning of the investigation there was no significant difference in resting pulse rates between the three groups, but the rowing and rugby groups had significantly higher fitness indices than the control group. There was no significant difference in the fitness indices of the two groups of athletes. At the end of the training period the resting pulse rate was significantly slower in the athletic groups than in the controls. The rise in physical fitness indices in the athletes was highly significant, whereas no significant change occurred in the controls. There was no significant difference in this respect between oarsmen and rugby players. In the athletic groups there was a significant correlation between low resting pulse rate and high fitness index, but in the controls there was no significant correlation between resting pulse rate and fitness index. The fitness index appears less subject to variation as a result of extraneous factors and more closely related to the capacity for strenuous exertion than does a low resting pulse.

Morris C. Davis, "The Athlete and Chronic Illness: An Essay on Human Potential," *Medical Journal of Australia*, I:797-800, June 13, 1959.

In chronic ill-health the morbid process of destruction is slow, and amazing physiological adaptation becomes possible. The reserve capacity which every organ possesses may be called "human potential." Factors affecting the athlete's potential include: (1) vasomotor makeup of the individual —the neurocirculatory asthenia so frequently seen in athletes must not be mistaken for heart disease. (2) Heat production — under humid conditions the temperature may increase to 108°F., with possible development of heat stroke. (3) Age — in some branches of athletics maximum efficiency may not be reached until the early thirties.

In the examination of athletes we should particularly look for the following conditions: (1) chronic morbid change in the cardio-vascular system, particularly enlargement, valvular lesions, and hypertension; (2) chronic renal disease, particularly albuminuria, polycystic kidney and chronic pyelonephritis; (3) chronic sepsis; (4) chronic nutritional deficiency; (5) chronic lung disease; (6) endocrine changes; (7) diabetes; (8) anemia.

Excessive rest may more rapidly cause wasting than activity. The judicious maintenance of activity in the presence of disease states is of great importance when such a state is found in the athlete.

Douglas G. Stuart and W. D. Collings, "Comparison of Vital Capacity and Maximum Breathing Capacity of Athletes and Non-Athletes." *Journal of Applied Physiology*, 14: 507-509, July, 1959.

Comparisons of normal and dyspneic subjects in such lung tests as vital capacity (VC) and maximum breathing capacity (MBC) are common, but little is known of their use in detecting superior physical ability. On theoretical grounds it is felt that athletic training may result in increased VC and the MBC has been thought to be closely related to exercise tolerance. Twenty varsity athletes were matched in terms of body size and age with 20 non-athletes. The mean VC score of the athletes was 5.69 liters; that of the non-athletes 5.29 liters, a difference statistically significant at the 5% level. The mean MBC of the athletes was 197 l/min.; that of the non-athletes 192 l/min., a difference which was not statistically significant. The difference in VC is undoubtedly due in part to increased development of respiratory musculature. The MBC appears to correlate more closely with patency of airways.

D. E. Hamilton, E. G. L. Bywaters, and N. W. Please, "A Controlled Trial of Various Forms of Physiotherapy in Arthritis." *British Medical Journal*, 5121:542-544, February, 28, 1959.

Therapeutic measures in physical medicine are seldom critically assessed. Much physiotherapy seems based on an authoritarian approach or on superficial observation. This study was designed to determine whether short-wave diathermy, infra-red radiation, faradic stimulation, or paraffin-wax baths produces the greatest functional improvement during one month's treatment, and whether there was any significant difference between these treatments and the treatment given to patients on the same basic regimen without the additional form of physiotherapy. Treatments were given for 20 minutes for three times a week. A control group was given diathermy "treatments" during which the current was not actually turned on. Each patient was also given active exercise. Range of movement, strength, time of walking under standard conditions, and other criteria were recorded.

No significant difference between the various treatments and the control groups were observed. The general impression is that the most useful measures in physiotherapy are those which maintain muscle power by active exercise and which maintain joint movement, good posture, and coordination of movement. While the other measures discussed in this paper may be useful adjuncts, the present study has not indicated that they are better than dummy treatments.

Leigh T. Wedlick, "Sports Injuries," *Medical Journal of Australia*, I:800-801, June 13, 1959.

The treatment of sports injuries is particularly difficult because of the athlete's tendency to return to competition before recovery is complete. Prevention of sports injuries includes (1) medical examination of the athlete; (2) conditioning; (3) teaching by the coach of correct techniques; (4) "warming up," and (5) correct apparatus and safety precautions.

Prompt medical examination of injuries is essential. Musculo-tendinous injuries tend to be neglected at the start or mistreated by a "rubber" and may become more troublesome than a fracture or dislocation. A blow to the thigh, with the development of effusion of blood into the muscles, should be treated for the first 24-48 hours with rest and perhaps a pressure bandage. This should be followed by heat and carefully graduated active movements to make sure that stiffness does not develop in the joints. It is important to give graduated resistance exercises to obtain full muscle power. If active movements are not carried out, adhesions which limit the range of movement and cause recurrent pain may develop. Use of ultrasonic irradiation and injections of novocain and hydrocortisone may prove helpful.

Full activity should not be resumed until recovery is complete, evidenced by freedom from pain, full range of movement, and full muscle power. If activity is resumed earlier, the injury tends to become chronic. In some cases the period away from sport may be prolonged, notably in the case of javelin elbow. In knee injuries it is vitally important to ensure full power in the quadriceps muscles.

R. Brooke, "Jive Fracture of the First Rib." *Journal of Bone & Joint Surgery*, 41B: 370-371, May, 1959.

Stress fracture of the first rib may occur from "rock and roll" and jiving. The fracture is a vertical one at the junction of the posterior and middle thirds of a rib, behind the attachment of the scalene muscles. The complaint of pain in the region of the thoracic inlet on the affected side, radiating down the back of the arm to the elbow, and in the pectoral region is probably caused by the pull of the scalene muscles and the rotation strain associated with the movement of the arms in this form of dancing. No treatment seems necessary except the wearing of a sling and the avoidance of jiving.

Leonard L. Lovshin, "The Tired-Mother Syndrome." *Postgraduate Medicine*, 26:48-54, July, 1959.

A tired mother is seldom suffering from organic disease or maladjustment. She is simply run-down and irritable because she cannot keep up with all the tasks she has set for herself. There are several subtypes of tired mothers: the working mother, the older mother, the immigrant mother. The amount of work accomplished is not necessarily an index of the amount of nervous energy used, since worry, indecision, and unhappiness drain off more than does purposeful activity. A mother may be fatigued even though she accomplishes little.

Three main methods of treatment are used: (1) Substition—an organic-sounding term such as "change of life" or "female trouble" is used to explain the fatigue and is then treated vigorously, although no organic disease is present. (2) Subtraction— tobacco, alcohol, coffee, tea, or overeating may be blamed for the fatigue and forbidden to the patient. (3) Subalimentation — vitamins are prescribed. However, no medication can take the place of the physician's forthright assurance based on a careful physical examination. Medication may be used for symptomatic relief. Pep pills of the amphetamine type have only limited usefulness and psychic energizers of the monoamine oxidase inhibitor group require further study. When fatigue is a manifestation of underlying neurosis, treatment is difficult. Nothing may be of help, particularly when the fatigue state results in a secondary gain.

Thomas F. Johnson. *et al.*, "The Influence of Exercise on Serum Cholesterol, Phospholipids and Electrophoretic Serum Protein Patterns in College Swimmers." *Federation Proceedings*, 18:77, March, 1959.

Physical activity by man on a high fat diet tends to inhibit the elevation of serum cholesterol. Eleven swimmers covered 1½ miles per day, in addition to land drills. Diets of ten of the athletes consisted of 40% or more of dietary fat. After several months no significant changes in serum cholesterol, phospholipids, or electrophoretic serum protein patterns were noted. This seems consistent with the premise that physical activity is effective in stabilizing serum cholesterol.

Hans Zellweger and William E. Bell, "Congenital Muscular Hypertrophy." *Neurology*, 9:160-166, March, 1959

The first report of congenital muscular hypertrophy in infants was made by Bruck in 1889. He described a 10-months-old girl as having the appearance of a wrestler due to the hypertrophied muscular system. Since that time a number of other cases have been reported, including three in this paper. A review of the literature indicates that congenital muscular hypertrophy in infancy is not a disease entity. Evidently several different categories exist. It may be associated with brain disease, Thomsen's disease, or muscular glycogenosis, or may be a benign idiopathic condition.

Editorial, "Boxing," *Lancet*, 7084: 1185-1186, June 6, 1959.

Early this year a former welterweight boxing champion was admitted to a mental hospital. In May a young amateur boxer died after being knocked out and another former welterweight champion was operated upon for intracranial haemorrhage. Most of the hazards of boxing are cerebral. Death is usually from gross injury to the brain or its vessels. Sixty-four boxers, including 22 amateurs, were killed in 4 years. The reality of the punch-drunk syndrome has been established beyond question. The medical case against boxing is so strong that doctors have a clear duty to fight for its total abolition.

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Book Reviews

"Circuit Training," by R. E. Morgan and G. T. Adamson. (London: G. Bell and Sons, Ltd., 1957. 88 pp. Available from Soccer Associates, New Rochelle, N.Y., $3.25)

"Circuit training" is a British concept which has attracted considerable attention from American track coaches but little from anyone else in this country. This little book, written by two members of the Department of Physical Education at the University of Leeds, is the basic description of this form of activity. The authors state that circuit training "aims at the development of all-round fitness rather than the fitness required for any particular game or activity . . . its value . . . is the development of general muscular and circulo-respiratory efficiency."

Fundamentally, the instructor sets up a circuit consisting of several stations, at each of which the student performs a different sub-maximal exercise. The student goes from one station to another without a rest pause, completing three circuits of the various stations. When this can be accomplished within a pre-determined time, the resistances are increased and the student trains until he again attains the pre-determined time, after which the resistances are again increased. Various modifications of this program can be employed, such as requiring a reduction in the time of the circuit, or of basing the stations so that certain parts of the body, types of activity, or desired outcomes are stressed. The authors give suggestions for various exercises and programs. The book is profusely illustrated with photographs and drawings and contains bibliographic citations.

While the authors are commendably modest in their claims for the value of such a program, it is noted that the Foreword contains a statement by an officer of the Medical Rehabilitation Centre, London, testifying to the good results produced by its use in pre-work groups.

Circuit training appears to be one of the important modern advances in the development of strength and endurance. As such it behooves every coach, trainer, and corrective therapist to be familiar with it. While the price may seem high for a text of this size and quality of binding and paper, no price can be placed on the value of the contents.

PJR

"Basic Biodynamics," by Edward J. Kempf. (New York: New York Academy of Sciences, September 30, 1958. 41 pp. $2.00. Paper.)

One of the basic problems of cellular development, and therefore of the social sciences, says the author, "is the demonstration of the laws of genetic and environmental determination of the development of individual unicellular and multicellular organisms and the evolution of species." He rejects all metaphysical theories and contends that the characters of the phenotype result solely from the interaction of genetic, cytoplasmic, and environmental factors in a manner consistent with the laws of thermodynamics. Based on his analysis of the mechanism of such interaction, he proposes six basic laws of biodynamics.

In effect this is a modern development of the philosophy presented to an earlier generation by Lloyd Morgan in his *Emergent Evolution*. It will be of interest primarily to those who received an indoctrination in philosophical thought during their academic years and are still concerned with understanding the world rather than simply manipulating small facets of it.

PJR

The Kinesiology of Weight Lifting, by Benjamin H. Massey, Harold W. Freeman, Frank R. Manson, and Janet A. Wessel. (Dubuque: William C. Brown Company, 1959. 175 pp. Paper. Spiral bound. $3.25.)

The purpose of this book is, say the authors, "to provide the weight lifter . . . with a practical guide based upon sound physiological and weight lifting principles." With that thought in mind they have covered nearly every phase of the subject — except, curiously enough, the kinesiology of lifting weights. After a general introduction to the subject, the history of weight training is discussed. In many ways this is the weakest chapter in the book. It is, for instance, not correct to say that prior to 1927 weight lifting in the United States was controlled by the American Continental Weight Lifting Association. The name of this organization was the American Continental Weight Lifters Association, and probably an equal number of the prominent lifters of the period belonged to a rival group, the American Bar Bell Men, who are not even mentioned. It is stated that DePietro pressed as much as 217 pounds; actually he is credited with 234.5. To place this in perspective it should have been stated that he is an achondroplastic dwarf. Grimek certainly is not "one of the most outstanding lifters," as the authors maintain. Chapters follow on physiology, lifting techniques, weight training exercises, competitive lifting, organization and administration (a certain sign the text was written by eduators!), measurement, and an Appendix containing sample records.

The reader is continually surprised by unexpected omissions: no mention is made of Tanner's study on the results of weight training; there is no reference to State's book in the chapter on weight training for athletics; there is no citation to MacQueen in the material on training techniques; there are no illustrations of the squat style in the pages on competitive lifting, the term squats is used synonymously with deep knee bends, circuit training is not mentioned, there is no discussion of the relative merits of the various training systems, and some of Hellebrandt's important studies are ignored. All of this creates the general impression that the authors are not particularly "at home" in this field. Such paragraph headings as "Are weight lifters dumb?" strike a jarring note in a text of this kind.

On the credit side the text is welcome as representing a step toward the long-needed rapprochement between the trained physical educators and those commercially interested in weight training, who, in spite of their often obvious lack of basic knowledge, certainly influence large numbers of people. The weight trainer who is serious in his efforts to learn will find that it provides him with a great deal more reliable information than he can obtain anywhere else for the same money.

PJR

Lehrbuch der Krankengymnastic (Textbook of Gymnastics for the Ill) by K. Lindemann, H. Teirich-Leube, and W. Heipertz. (Stuttgart: Georg Thieme Verlag, 1959, 328 pp.)

This is the first of four volumes designed as standard textbooks for students and practitioners of exercise, corrective, and physical therapies. It consists of eight chapters: (1) General human physiology; (2) Etiology of the most common diseases, with emphasis on diseases and injuries of bones, joints, muscles, and tendons; (3) First aid and the art and science of bandaging; (4) History of exercise therapy; (5) Fundamentals of exercise therapy; (6) Methods and techniques used in exercise therapy; (7) Pool therapy; (8) Massage.

Each chapter is very complete and leads the reader methodically from the simple to the most complex phases of each subject. In addition to the very elaborate text there are 222 illustrations, many of them photographs. This first book promises that all four volumes will be of great assistance in the study and practice of the therapies based on exercise and other physical agents.

RK

Japan—Three Epochs of Modern Education, by Ronald S. Anderson. (Washington, D. C.: U. S. Department of Health, Education, and Welfare. Bulletin 1959 No. 11. 219 pp. $1.25. Paper.)

This study is the third to be published as a result of on-the-spot reporting of Japanese education. The previous two, by Murray and by Lewis, were published in 1873 and 1900 respectively. Discussed in the present study are the Initial Modernization Epoch (1872-1937), the Wartime Epoch (1937-1945), and the Democratization Epoch (1945 to present) for each of the various aspects of education. Although he has given comprehensive and detailed coverage of the contributions of United States educators and education, Anderson has avoided mention of the contributions of other nations to Japanese education. In 1866 the Tokyo Imperial University, which served as a model for succeeding Imperial universities, was reorganized from the U. S. to the German pattern. A discussion of whether this was a result of change in national policy, the outcome of critical evaluations, or due to the influence of certain individuals would be of interest and benefit to the reader.

The book is well organized, well written, and adequately supplied with illustrations, most of which contribute to a better understanding of the subject. Those interested in comparative education or the history of education can well afford to include Anderson's book in their libraries.

WRP

Dr. Carlos J. Finlay, by Sol Bloom. (Havana: Ministry of Health and Social Assistance, 1959. 34 pp. Paper.)

Carlos Finlay, a Cuban physician, discovered that yellow fever is transmitted from man to man by the bite of a certain kind of mosquito. In its day the idea of the transmission of a disease from man to man through an intermediate agency was both novel and revolutionary—and all but ignored. Eventually the failure of all other methods forced the sanitarians to try Finlay's suggestion. The result was the elimination of this disease. This pamphlet is a reprinting of a speech delivered in the U. S. House of Representatives by the Hon. Sol Bloom, Chairman of the Committee on Foreign Relations, to which have been added pictures and other historical documents.

PJR

Vocational Rehabilitation for the Physically Handicapped, by Louise M. Neuschutz. (Springfield: Charles C. Thomas, 1959. 136 pp. $5.75)

This book covers such problems as (1) The Cardiac; (2) The Orthopedically Handicapped and the Cerebral Palsied; (3) The Deaf and Hard of Hearing; (4) The Blind and Partially Sighted; (5) The Arrested Tuberculous; and (6) The Elderly and the Aged. It is intended "as an aid to the physically handicapped, including the homebound, their families — and welfare workers." This book achieves its stated intention. It is not a text book, but it should add hope, direction, and encouragement to the physically handicapped.

NWF

A Manual of Bandaging, Strapping and Splinting, by Augustus Thorndike. Third Edition. (Philadelphia: Lea & Febiger, 1959. 153 pp. Paper. $2.75)

The title of this little booklet — and Dr. Thorndike's well-known connection with sports medicine—might cause a prospective buyer to believe that it deals with the treatment of sports injuries. Actually, its field is considerably broader. Its purpose is to present the common types of bandages, strappings, and splints for which the inexperienced medical student, nurse, or orderly might have need. It is simply written, profusely illustrated, and well indexed. Those for whom it is designed should find it useful indeed, and the athletic trainer will profit by adding a copy to his bookshelf.

PJR

Personal and Community Health, 11th Edition, by C. E. Turner. (St. Louis: C. V. Mosby Co., 1959, 446 pp., $5.50.)

Intended for college students, this is a text which is well organized, admirably illustrated, and clearly written, but whose textual material varies from prosaic fact to complete bias. A textbook should generalize on the basis of all available evidence as well as being a source of Authority. Therefore, it is discouraging to read such statements as, "Growth is definitely retarded under the influence of tobacco," and "Where staying power in athletics is demanded, tobacco lowers athletic performance." These statements are in no way supported by the evidence as summarized by Bartley and Chute, Karpovich, and Montoye *et al.*, and are direct contradictions on the conclusions of Morehouse and Rasch. Futhermore, in support of his contention that there is considerable evidence that cigarette smoking is an immediate causative factor in the increasing amount of lung cancer, Turner cites only Hammond and Horn. The conclusions drawn by these investigators have been severely questioned by Berkson, a member of the Research and Statistics Committee of the American Cancer Society from which the Hammond and Horn study was launched. Evidently Turner is not aware of Berkson's papers. If one objects that an undue amount of criticism has been levelled against such a specific part of the book, let it be noted that in *Personal and Community Health*, eleven times as much space has been devoted to tobacco as has been given to antibiotics and five times as much as to "mind-body relationships." In the Oral Hygiene chapter no mention is made of the relationship between certain personality traits and the incidence of caries, nor is there any discussion of the environmental and hereditary factors involved.

The material concerning community health is adequate but neither unique nor inspiring in its presentation.

Now, indeed, is the time to come forth with a new text on personal and community health. Recent developments in pharmaceuticals, new concepts of the roles of heredity and personality in physical impairment, and the re-examination of the effects of athletics and training programs have made obsolescent many standard texts in health education. In this reviewer's opinion, improved format alone does not justify a new edition. Some attention must be given to the improvement of material.

WRP

"Nutrition and Atherosclerosis" by Louis N. Katz, Jeremiah Stamler and Ruth Pick. (Philadelphia: Lea and Febiger, 1958. 146 pp. $5.00)

In recent years the increasing interest in the relationship between atherosclerosis and diet has been reflected in the many studies in this area. This is entirely appropriate since atherosclerosis is a leading killer and disabler not only of the elderly, but of those apparently in the prime of their middle years. The authors have reviewed, integrated, and condensed a bibliography, including their own work, of 787 references into less than 100 pages of text and graphs, a valuable service. Their criteria and precautions will be of interest to all interested in properly evaluating the various prophylactic and therapeutic regimens advocated in the literature. Simple, specific, sensible recommendations for dietary prophylaxis are included which merit the attention of those who are in a position to advise patients with a high risk of developing atherosclerosis or with such manifestations of atherosclerosis as coronary artery disease or cerebral artery thrombosis.

DJS

"Twenty-Seventh Annual Survey of Football Fatalities," by Floyd R. Eastwood. (Cincinnati: American Football Coaches Association, January 8, 1959. 16 pp. Paper.)

During the fall of 1958 a total of 17 fatalities were directly associated with football. Recommendations for the prevention of such accidents include increased attention to muscular development, better training in the fundamentals of the game, better direction of games, more extensive "warm-ups," and improved equipment.

PJR

Contributions of the Physical, Biological, and Psychological Sciences in Human Disability. Annals of the New York Academy of Sciences, Volume 74, Pages 1-160. (New York: New York Academy of Sciences, September 30, 1958. 160 pp. Paper.)

The New York Academy of Sciences has long been known for the scholarly quality of its publications. This one is no exception. Starting with the premise that the problems of human disability require an interdisciplinary approach, the contributors apply themselves largely to the question of how the physicist and the engineer can contribute to the work of the medical and biological scientist in improving the lot of the handicapped. As might be anticipated, a considerable amount of space is devoted to prosthetics, and perhaps the outstanding papers in the text are the two dealing with gait, one by Marks and Hirschberg and the other by Drillis. Staros, however, was quick to point out that the physical scientists' contributions were actually far greater than might be inferred from the latter's contribution, and some of the following speakers went on to suggest ways in which engineering achievements may replace sensory losses. Another particularly interesting paper was presented by Weiss, in which he discussed factors which the concept of the body image indicates must be considered in the design of artificial limbs.

For any one concerned with research in disability or seriously interested in the prospect of "things to come" in this field, this book constitutes required reading.

PJR

"The Handicapped: A Challenge to the Non-Handicapped," by Adolph A. Apton. (New York: The Citadel Press, 1959. 124 pp. $3.00)

Dr. Apton is a distinguished plastic surgeon who is widely read not only in his medical specialty but also because he brings to bear upon rehabilitation an unusual understanding of the moral and cultural implications of disability and chronic disease. He is convinced that therapeutic measures, important as they of course are, have to be supplemented by an ever growing effort on the part of society to help and accept the patient as a human being.

In this volume the author reviews developments in rehabilitation in the United States during the past decades; discusses the significance of recent medical discoveries, such as the polio vaccine, in their effect upon the total situation regarding crippling diseases; discusses the handicapped child with special reference to the need of teaching normal children to receive their less fortunate classmates with deliberate understanding; dwells upon problems of the handicapped adult including those with whom the plastic surgeon is called upon to make a special contribution, and concludes the book with an account of educational, vocational and social aspects of the issue.

The volume reflects Dr. Apton's competency as well as his deep understanding of the ethical aspects of disabling diseases. Physicians and educated laymen alike will benefit from his study.

EJ

BOOKS RECEIVED

"Survey of State Legislation Relating to Higher Education," by Ernest V. Hollis, William G. Land, and S. V. Martorana. (Washington, D.C.: Office of Education, U.S. Department of Health, Education, and Welfare. Circular No. 552. 1959. 115 pp. Paper. 70c.)

Covers period July 1, 1957 to June 30, 1958.

"Answers to Health Questions in Physical Education." (Washington, D.C.: American Association for Health, Physical Education, and Recreation, 1959. 22 pp. Paper. 50c)

Answers to common health questions asked by the layman.

No Longer Alone.

1958 Annual Report of the National Association for Mental Health. (See News and Comments)

News and Comments

FIRST TEXAS A & M STUDENTS COMPLETE CLINICAL TRAINING AT VA HOSPITAL, HOUSTON

l. to r., Lee D. Cady, M.D., Manager, V.A. Hospital, Houston, Texas; Leon Jackson; John Arena, Chief C.T.; Lynn Laird, and Rudy Rodriguez. Absent from the picture were D. W. Holzaepfel, Clinical Training Supervisor; Carl Landiss, Ph.D., university coordinator and E. C. Tichsler, Ph.D., Head of the Physical Education Department, Texas A & M.

NEW PITUITARY TEST DEVELOPED

Development of a chemical test to measure functions of man's "governing" gland has been announced by the Veterans Administration today. The technique, devised by a research team from the Buffalo, N.Y., VA hospital and the University of Buffalo, measures certain functions of the pituitary gland. The anterior lobe of this gland, located at the base of the brain, secretes hormones that regulate the proper function of the thyroid, adrenal, and other glands of internal secretion.

Dr. Grosvenor W. Bissell, director of the research team, said preliminary studies indicate the test may be of value to doctors in diagnosing pituitary and adrenal malfunctions. In addition, in patients in whom the pituitary gland has been suppressed as the result of certain treatments, the test may be useful in determining the gland's ability to respond in various emergency situations, such as a severe infection or a surgical operation.

Some 100 persons, including 24 who had no disease of the pituitary or other such glands of internal secretion, have been tested with the new technique.

The research team used the chemical, SU 4885, to release a chemical "brake" that secretion of the adrenal cortex normally places on the pituitary. The uncontrolled pituitary then stimulated the adrenal cortex to produce larger amounts of a substance known as deoxyhydrocortisone, or Compound S. By measuring the amount of Compound S in the blood plasma, the team was able to determine the extent of anterior pituitary function. No Compound S was found if the pituitary was not functioning, and if it was functioning poorly the amount of Compound S was limited.

Dr. Bissell is chief of medical service at the Buffalo VA hospital and associate professor of medicine at the University of Buffalo School of Medicine. Other members of the research group are Dr. Alvin L. Scott, Dr. Wells E. Farnsworth, and technologist Isabelle Winkler. Their work was supported by grants from the Chautauqua County Tuberculosis and Public Health Association and the Ciba Pharmaceutical Company.

OPEN DOOR POLICY EXPANDING IN MENTAL HOSPITALS

The Veterans Administration is changing its mental hospitals into "open-door" treatment communities, the agency has announced. A large number of the patients live and work at the hospitals and come and go about the hospital grounds and nearby towns, much as they would if they lived in any community, while they continue to participate in and receive hospital treatment.

Dr. Jesse P. Casey, director of the VA psychiatry and neurology service in Washington, D.C., said the development is in line with the best modern concepts of psychiatry and is doing a great deal to speed recovery of patients. He said "open-door" mental hospitals have reported fewer patients leaving against medical advice, fewer acts of hostility, and higher discharge rates than "closed" mental hospitals.

The VA "open-door" policy is backed by an active treatment program involving extensive orientation of the entire staffs of the hospitals and assistance of volunteers from nearby communities, Dr. Casey said. However, he said not all patients are able to accept the responsibility of more freedom, and therefore it is necessary for the hospitals to maintain supervision for these patients in closed wards.

Granting of the maximum practicable amount of personal freedom is a major factor in rehabilitation of psychiatric patients, Dr. Casey explained, as it gives them opportunity to learn to make their own decisions and adapt to new situations. He said many patients in VA mental hospitals now choose their own clothing, get their haircuts independently at the hospital barber shops, and select their own recreation from a wide variety offered by the hospitals. Many also are able to participate in work-therapy assignments and make occasional visits to their homes as a preparation for return to life outside the hospital, he added. The "open-door" policy at VA mental hospitals is an extension of the practice, long followed by the agency, of enabling mental patients to keep in touch with their families and friends and live as normal lives as possible.

To encourage mental patients to lead as normal lives as possible, some 20,000 patients are treated each month at VA mental hygiene clinics instead of being hospitalized and more than 65 VA general medical and surgical hospitals have sections for short-term treatment of psychiatric patients, Dr. Casey said.

FOSTER HOME REPORT SHOWS GAIN

Placement of recovering mental patients in foster homes is now giving the Veterans Administration the equivalent of a 1,500-bed mental hospital, VA has reported. The agency's foster home program was started in 1951 to expand its psychiatric rehabilitation program, especially for those veterans hospitalized for a long period of time. It allows recovering mental patients to live in a home environment as a step in their return to the community.

VA said 1,554 patients from its mental hospitals lived with "adopted" families in private homes near the hospitals during 1958, a 24 percent increase over the 1,249 in foster homes in 1957 and a 53 percent increase over the 1,011 in the homes during 1956.

The hospitals placed 807 patients in the homes during 1958 and reported 328 of those in the program recovered sufficiently during the year to be discharged from hospital

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WOMEN'S AQUATIC GROUP ANNOUNCES RESEARCH GRANT

The Women's National Aquatic Forum has recently established an annual research grant in the amount of $300.00 to be awarded to one or more qualified women in the profession, either graduate students or workers in the profession. Applicants for the grant must submit applications by November 15th. Complete details may be obtained by writing Gertrude Goss, Chairman, Women's National Aquatic Forum, 20 Chestnut Park, Melrose, Mass.

VA HAS EXTENSIVE RESEARCH ON AGING

A healthier and happier old age for men and women in general is a likely result of extensive Veterans Administration research in aging, Sumner G. Whittier, the Administrator of Veterans Affairs, has reported. Mr. Whittier said VA's research in this field is now established to an extent that could significantly affect the health and well-being of the peoples of the world in their later years.

"Our medical staff is learning more about almost every aspect of aging, especially the major diseases such as high blood pressure, hardening of the arteries, heart attack, and strokes, and VA is becoming better able to combat the psychological aspects of aging," he said. VA's concentration of its research resources in the field of aging is planned on a continuing basis, keyed with aging of the veteran population and the sharp increase in incidence of the degenerative diseases that occurs with age, Mr. Whittier explained.

Today, of the more than 22 million veterans, only about 6 million are **over** 45, but in 12 years there will be only 6 million veterans **under** 45. Currently, about half of the VA's hospital patients are 55 years or older. In an effort to meet this situation, many of VA's nearly 6,000 research projects deal with aging. Collectively, these now cover every medical condition that increases with age. In general, the projects are of three types—studies aimed at specific physical diseases and disabilities, psychological and psychiatric studies, and research on basic aspects of aging such as the changes in connective tissue and hormone changes with aging.

In addition to individual studies, there are four major cooperative projects:

1. An 11-hospital study of drugs used for treatment of high blood pressure, which is progressing satisfactorily.
2. A year-old, 14-hospital study of hardening of the arteries, heart attacks, and strokes.
3. A 16-hospital study of lung function in older men.
4. Participation of 64 groups in 59 VA hospitals in the national cancer chemotherapy program under the National Cancer Institute.

A most varied and extensive VA attempt to correlate physical and mental changes with age in individuals is in progress at the Martinsburg, West Va., VA center, where the rate at which the function of the thyroid gland diminishes with age has been established. "Brain wave" changes with age and differences in response to drugs, such as the tranquilizers, also are being established at the Martinsburg center. Study of the chemistry of connective tissue and its response to hormone administration is another aspect of the research there.

Study of the ground substance or intercellular cement of the body is regarded of such importance by VA that laboratories have been established at both the Downey, Ill., and Pittsburgh, Pa., hospitals to learn more about its nature and responses to drugs and hormones.

The psychology of aging and aged patients is the subject of many VA studies to establish the extent and basis of altered mental attitudes so that corrective or preventive measures can be prescribed. In connection with these, methods of psychological testing are constantly being examined and improved by VA personnel. At the Kecoughtan, Va., center, for example, a laboratory has been established for development and improvement of electronic devices used for psychological testing.

At the Brooklyn, N. Y., VA outpatient clinic, a screening program for glaucoma, the greatest cause of blindness

Representative of the numerous studies of the indivifacts about this disease.

The effect of diet is being observed in domiciliary in old age, is under way as a start toward establishing clinical aspects of diet are being investigated at the West Roxbury, Mass., VA hospital, and the effects of anticoagulants on fats circulating in the blood stream is under study at the Iowa City VA hospital.

By correlating hearing acuity with age and health of older veterans at the West Side VA Hospital in Chicago, VA doctors hope to determine whether hearing decreases regularly after 40 years of age.

Mouth and dental changes with age are being studied at the Wadsworth, Kans., VA hospital, and the effect of age on intestinal motility is being investigated at the Manhattan, N. Y., VA hospital.

residents at the VA center in Los Angeles. Chemical and dual as a whole—his physical condition, emotional makeup, diet, habits, and life history — is the study of Spanish-American War veterans at the Boston VA outpatient clinic.

"Many of these octogenarians seems to have been endowed with unusual vitality and an outlook on life that keep them young far beyond their years," Mr. Whittier

OHIO UNIV. STUDENTS COMPLETE CLINICAL TRAINING

Glen Chester and Douglas Mathews, students at Ohio University, Athens, have recently completed clinical training in corrective therapy at V.A. Hospital, Chillicothe, Ohio. Mr. Chester is a graduate student at the university and Mr. Mathews is a senior majoring in physical education. Standing with Mr. Chester and Mr. Mathews are Robert Davis, Chief, Corrective Therapy (l.) and George Jurcisin, Supervisor, Clinical Training (r.) of the Chillicothe hospital.

NORTHWESTERN OFFERS PROSTHETIC EDUCATION PROGRAM

The Northwestern University Medical School has announced its first prosthetic education program for physicians and surgeons, therapists, prosthetists and orthotists and rehabilitation counselors. Courses specifically designed for therapists include one each on above-and below-knee prosthetics, each course being a five day-full time program. The above-knee course will be offered twice; the weeks of December 14, 1959 and June 20, 1960, respectively. The below-knee course will be offered three times; the weeks of February 15, March 14 and May 16, 1960, respectively. Courses for other professional personnel are offered on different weeks.

The program operates on a grant from the Office of Vocational Rehabilitation of the Department of Health, Education and Welfare. Classes will be held at the Rehabilitation Institute of Chicago.

Each of the courses offered to therapists involves a tuition fee of $75.00. A limited number of traineeships provided by the Office of Vocational Rehabilitation is available to assist students. All applications should be made through the Director of Prosthetic Education, Northwestern University Medical School, 401 East Ohio St., Chicago 11, Ill.

BENEFITS OF 'ARTIFICIAL KIDNEY' DESCRIBED

Five years' experience in using an "artificial kidney" at the Seattle Veterans Administration hospital has shown that its use can effectively be extended to additional patients—before they become dangerously ill from kidney failure. The device, which acts as a substitute for a patient's own kidneys, in many instances should be used earlier in the course of the illness and used more frequently than has been the usual practice, Dr. Belding H. Scribner of Seattle has reported. By doing so, many lives might be saved, the doctor believes.

The "artificial kidney" is a device which acts to filter impurities from a patient's blood by passing it through a series of cellophane membranes. The process is known as artificial dialysis. Such equipment has come into use only in recent years to treat cases of acute renal failure. This is a condition in which the kidneys cease to function following severe injuries, burns, surgery, infections, obstetrical conditions, poisoning or transfusions. Without the substitute device, acute renal failure is almost always fatal.

Dr Scribner was on the staff of the Seattle VA hospital in 1954. He conducted research which resulted in building one of the first artificial kidneys in this country. He is now an associate professor of medicine at the University of Washington and heads a team of physicians who use the device. The VA hospital is a teaching center for the university's medical students. The VA supported Dr. Scribner's research and has sponsored the artificial dialysis service at the hospital.

After a scientific review of the first 42 patients given artificial dialysis, Dr. Scribner has concluded that the process should be used primarily to prevent the uremia which results from kidney failure, rather than only to treat patients after it occurs. Whenever possible, the artificial kidney must be used before there are complications involving the patient's lungs, Dr. Scribner emphasized. If there are complications of this sort, death usually follows.

For successful treatment, there must be a carefully worked out plan of supportive care to prevent pneumonia and infection and other strength-sapping complications. Patients with renal failure often need attention from specialists to care for complex blood conditions, obstetrical, surgical or orthopedic problems, or psychoses produced by their toxic state.

Only in a "renal center," where these specialists are available, and where sufficient cases of renal failure occur to provide constant experience for the artificial kidney team, can adequate treatment be given, Dr. Scribner said.

Under management of a trained team, use of the artificial kidney is entirely safe, even for critically ill patients. But because the use affects the level and composition of the patient's body fluids, the process of artificial dialysis is an extremely complicated one, requiring constant monitoring.

Dr. Scribner, who is a member of the council of the American Society for Artificial Internal Organs, believes it now is possible to increase survival rates in patients with renal failure who have had surgery or who have been injured. Mortality in this group has been very high in the past. For these two classes of patients, the artificial kidney offers increasing hope. The doctor's conclusions and technical review were published in the medical journal *Northwest Medicine.*

AGING VETERANS SUBJECT OF NEW STUDY

Establishment of a new agency-wide Veterans Administration committee to make an extensive study of medical, social, and economic problems of aging veterans has been announced by the Administrator of Veterans Affairs, Sumner G. Whittier. Under chairmanship of the VA Deputy Administrator, Bradford Morse, the Committee on Aging will coordinate the VA's many activities and programs in the field of aging with other agencies and will make recommendations to Mr. Whittier for carrying out the nation's responsibilities to its aging veterans in the future. As the VA Administrator and member of the cabinet-level Federal Council on Aging appointed by President Eisenhower in March, Mr. Whittier is responsible for furnishing leadership in the field of aging.

The Council is charged by the President with aiding the various Federal agencies in improving the effectiveness of their programs in the field of aging and with assisting the Secretary of Health, Education, and Welfare in planning and coordinating the White House Conference on Aging to be held in January 1961.

The problems the VA is facing in regard to care of aging veterans are identical with problems faced by the nation in regard to the over-all aging of the population, Mr. Whittier pointed out. "These are more than medical problems—they are social and economic problems as well—and they are intensified in the VA because of the age of the veteran population," he said.

"The average age of World War I veterans now is 65 years and the average age of World War II veterans is 40 years. The average age of veterans receiving VA medical care, 51 years, already shows the predominance of the elderly.

"But the real peak in numbers will come with aging of World War II veterans. Today, of the 22 million veterans, about six million are over 45. In 12 years, there will be only six million under that age.

"The direct responsibility the VA bears for care of this aging veteran population creates an opportunity for development of solutions that should be capable of translation into approaches and methods applicable to the general population.

"The solutions lie to a large extent in eliminating the concepts of rocking chair retirement and old folks' homes. A positive approach of integrating senior citizens into the community life—not segregating them—is needed.

"The Veterans Administration intends to meet the challenge head-on and solve it as it did that of demobilization and readjustment."

In recognition of the importance of medical problems to older veterans, medicine has been given major representation on the new VA Committee on Aging. Of the 31 members, all drawn from higher staff levels of the agency's departments and divisions in Washington, D.C., 15 are from the VA Department of Medicine and Surgery.

CHAPTER PRESIDENTS

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MANPOWER SHORTAGE CITED IN MENTAL ILLNESS STUDY

The stark realities of the mental health manpower shortage are the subject of a study released June 25 by the Joint Commission on Mental Illness and Health.

The study, written by Dr. George W. Albee, Western Reserve University professor of Psychology and published by Basic Books, comes to the following conclusion:

• Sufficient professional personnel to eliminate the glaring deficiencies in our care of mental patients will never become available if the present population trend continues without a commensurate increase in the recruitment and training of mental health manpower.

• The only possibilities of changing this negative outlook for hundreds of thousands of mental hospital patients would require a great change in our social attitudes and a consequent massive national effort in all areas of education, including large increases in the number of mental health personnel, or a sharp breakthrough in mental health research.

Despite recent progress, the outlook for any of these alternatives provides no basis for great optimism, according to Dr. Albee.

The bulk of Dr. Albee's 350-page report, *Mental Health Manpower,* is devoted to a clear and forceful analysis of the background causes of the shortage of psychiatrists, psychiatric nurses and psychiatric social workers needed to provide first class treatment for the mentally ill.

He relates the mental health manpower shortage to the general shortage of professional manpower in the United States. In turn, he relates this general shortage, including scientists, teachers and many other categories, to the deficiencies in our system of high school and college education insofar as it relates to stimulation of our bright young people to go into professional careers, particularly in science.

This lack of stimulation, he holds, arises from the paradox that, whereas modern man's industrial productivity and healthier way of life have depended on the creative thought arising out of education and science, the trend in our social and cultural values has been anti-intellectual, anti-educational and anti-professional.

As a result, he points out, two-thirds of the brightest youngsters in the country are lost to the professional manpower pool. In other words, of the twenty per cent of youngsters who fall in the top fifth of their high school classes in intelligence, less than seven graduate from college.

The slight increase in recent years of doctors of medicine who go into psychiatry, Dr. Albee points out, is not sufficient to maintain even the present ratio of one psychiatrist per 18,000 population, much less contribute toward fulfillment of the frequently quoted but wholly wishful estimate that today we need twice as many psychiatrists as we now have—20,000 instead of the present 10,000.

The present upward trend in the United States population (up 3,000,000 a year) will mean not only an increasing shortage of psychiatrists but of physicians in general, he stresses. Thus, as the public demand for mental health services has increased, the capacity of the mental health professions to meet the demand appears to be lessening. This seems particularly so because the shortages in other positions on the mental health team—particularly in psychiatric nurses and social workers—is worse than it is in psychiatrists.

Albee reasons, quite logically, that we cannot evaluate the shortages of professionally trained manpower in the mental health field without at the same time contemplating the widespread shortage of highly trained persons in a variety of technical and professional areas. The reason is simple: We all draw on the same pool—namely, young men and women who graduate from college. Any particularly successful efforts at recruitment in one field must necessarily be made at the expense of any other also reporting a shortage.

Any upward trend in the supply of any and all kinds of professional manpower will depend, then, on the strength of our educational system and the motivation of our youth in greater numbers to seek professional careers. The nature of a profession, with its emphasis on expert knowledge and specialized service to others, presupposes superior mental competence, moral reponsibility, and advanced educational achievement.

At present, our system of education at both high-school and college levels apparently fails to inspire students fully to utilize their brain power in ways that would prepare them for professional careers. There is, Dr. Albee states, a fundamental lack of appreciation and interest in intellectual achievement in our society and its schools and colleges.

Commented Dr. Jack R. Ewalt, director of the Joint Commission on Mental Illness and Health, in a staff review of the Albee report:

"The chief intent and value of *Mental Health Manpower* has been to give us a bedrock statement of the nature, breadth, depth, and over-all significance of the manpower problem.

"From this bedrock it becomes the task of the Joint Commission as well as of all interested persons to erect a program that will help us locate, build, and fill our professional manpower pool," Dr. Ewalt continued.

"No recommendations have been spelled out in this report to the point that they could be considered a basis for action. This, in truth, is the function of the Joint Commission itself. . .

"It is apparent, of course, that any general solution of the professional manpower shortage must depend on new, greater and more successful efforts to support our educational system from the elementary school all the way through the graduate school. . .

"But it is a question how much of the needed support will be forthcoming, out of either public or private funds, without important changes in public attitudes toward teaching, toward study, and toward people who try to use their minds in a rational manner. . .

"We know of no national effort that is consciously, systematicaly, aggressively working at the problem of creating favorable images of professional people among high-school students . . . above all, nothing in the field of mental health itself. . .

"The task is one of creating more interest in working with people rather than with things. . .

"This prompts the question of who would provide such stimulation or models for imitation. We already are shockingly short of competent teachers in the sciences. Here we must allow our imaginations to run and improvisations to creep in.

"What young psychiatrist, psychologist, psychiatric nurse, or psychiatric social worker would not be persuaded, if such a cooperative program was undertaken under joint educational and mental health auspices, to give an hour a week as a visiting teacher to lecture high-school students in his own neighborhood on some of the simpler elements and mechanisms of the individual, social, and cultural behavior of human beings? Not all would want to do so, and not all would be suited for this task, but with sufficient stimulation and willingness to overcome obstacles it could be done. . .

"Such a proposal would have to be tried to be proved. But when we contemplate the number of highly trained, competent, and successful professional persons that can be found in various walks of life in most communities, and also contemplate the capacity of Americans who manifest community interest and do voluntary work when called on, we must admit that we have approached the question of teacher shortages and bob-tailed curricula rather unimaginatively.

"Unless people who consider themselves intelligent and educated—even 'eggheads'—take action of the sort that will win them respect and emulation in their communities, they will lose the battle against professional manpower shortages by default. And all of us . . . will be the losers."

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NATIONAL SPORTS CO., Mfgrs. of Therapy Gym Mats, 360 Marquette St., Fond du Lac, Wisc. ..... WA 1-8200

FORM 3547 REQUESTED
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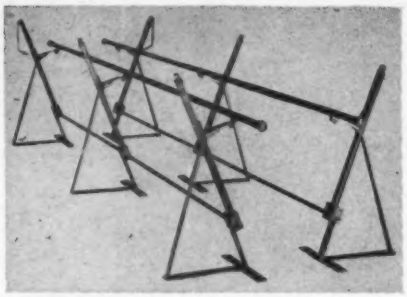
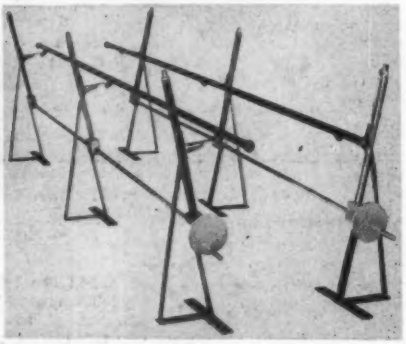
La Berne PARALLEL BARS



MODEL 101 AD

12° angle requires 15" floor space. Each section adjustable in height from 17" to 44". Width adjustment 18" between high and low positions. Operated by folding handle.

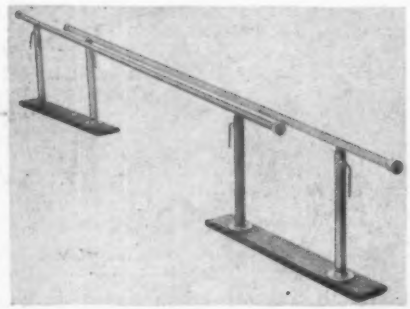
10-12 ft. $295.00
14-16-20 ft. 395.00



Model 301 W—10°

Requires 12" floor-space. Each section adjustable in height from 22" to 44". Width adjustment 14" between high and low positions.
Operated by counter-balanced handle.

10-12 feet $295.00
14-16-20 feet $395.00



PORTABLE PARALLEL BARS—No pins to insert adjustable by hand crank through worm and gear.

Bars mounted on platform fitted with 2 sets handrails adjustable in height from 16" to 40" by hand crank. Distance between rails is 24" for upper rails, 19" for lower rails. Platform has slight incline at each end fitted with detachable abduction board. Platform finished in natural wood, handrails finished in Atactic bronze.

Bars require only one person to adjust and may be adjusted by patient from wheelchair. NO PINS to INSERT—worm gears automatically lock bars from moving up or down at any stopped position. Model 175—10 ft. bars $350.00
Upper handrails available in hardwood, no extra cost when specified with order.

ALL PRICES FOB COLUMBIA, S. C.

WRITE FOR CATALOG

TELESCOPIC MODEL (404)

Mounted on platform. Telescopic height adjustment from 22" to 38". Platform has slight incline at each end, detachable abduction board, platform finished in natural wood. Handrails are hardwood, natural finish. Uprights Mellotone grey.
MODEL 404, 10 feet $175.00
MODEL 410 (as above with 2 pair handrails) $195.00

PORTABLE FOLDING PARALLEL BARS (Model 4400-P)

Telescopic height adjustment from 21" to 38". Requires only 8" floor space when not in use. $98.50

La Berne MANUFACTURING COMPANY

PO Box 5245 Columbia, S. C. Phone SU 7-6162

WALK-OFF®

Originators of the "WALK-OFF" Physical Therapy table